The IRON AGE

February 13, 1958 A Chilton Publication The National Metalworking Weekly

How to Get More For Your Castings Dollar P. 127

THE OTHER TURN

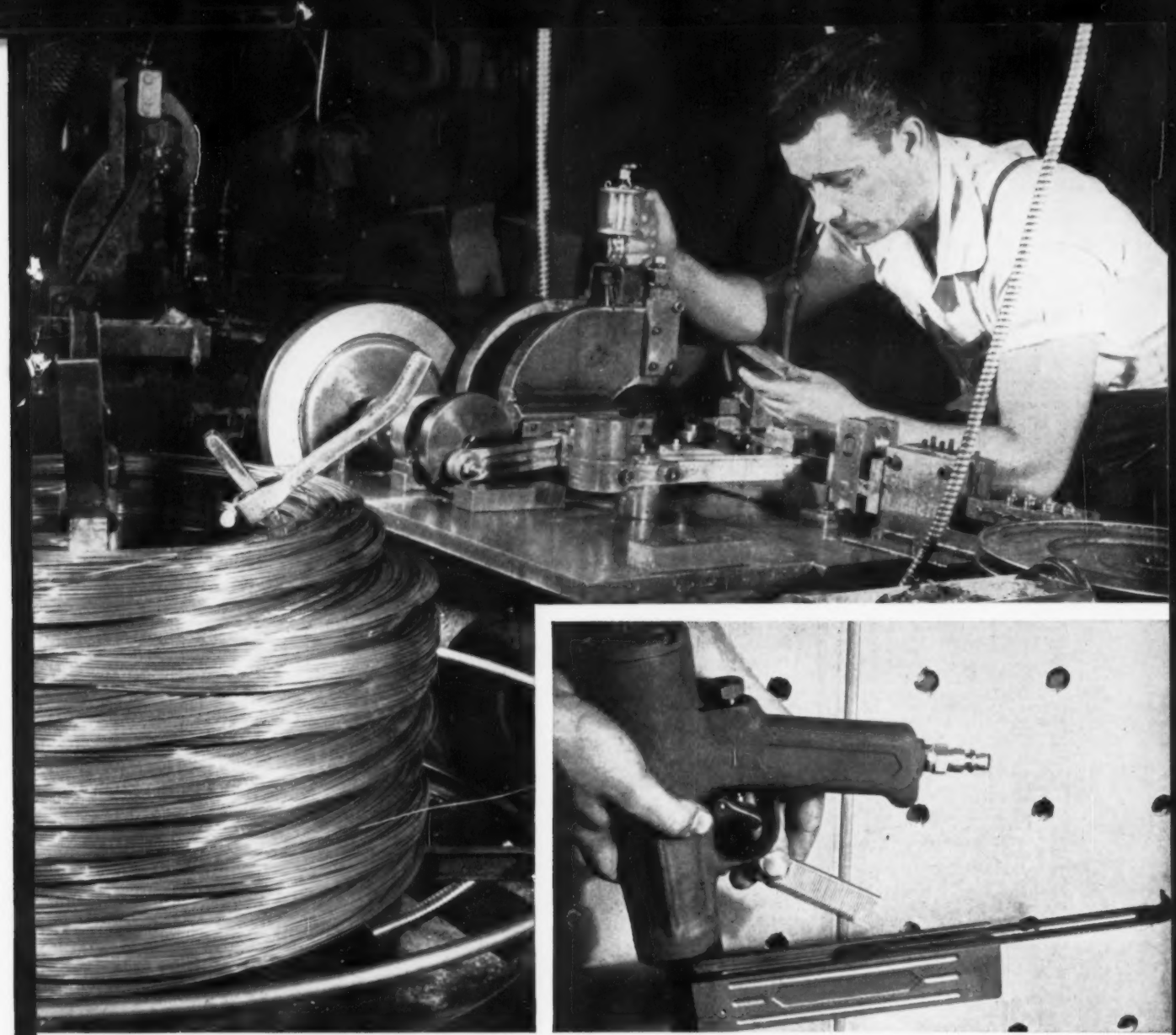
The Art Collector

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

"Magnefer and Syndolag Set Fast—Stay Fast"

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO



Now you can fasten almost anything with staples shot from guns

Here they're making staples from a coil of Bethlehem 16-ga galvanized steel wire. Not ordinary office-type staples, but big and sturdy industrial staples, ½ in. to 1⅝ in. long, for fastening gypsum and metal lathing. Staples like this can be driven fast with a portable air-gun weighing only about 5 lb.

What a variety of fastening jobs industry is doing with staples these days! They're fastening crates, boxes, bedding, furniture, flooring, siding, roofing, cabinet work. They're even stapling the ribbing on boats!

Producing the right grades of stapling wire, both galvanized and bright, is a familiar task for our modern wire mills. As a matter of fact, Bethlehem turns out steel wire for just about every imaginable use. Some are general purpose grades; others are tailored to meet the requirements of such products as cold-headed screws, upholstery springs, bicycle spokes, lock washers, brush handles, and armor wire for cables.

The steel wire that's best for your product is likely to be a grade and quality we're producing right now. A Bethlehem representative will gladly give you prices, delivery and other details. Just call or write the Bethlehem sales office nearest you. Your inquiry will receive prompt attention.

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BETHLEHEM STEEL

BETHLEHEM STEEL

THE IRON AGE
Chestnut and 56th Sts.
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The IRON AGE

February 13, 1958—Vol. 181, No. 7

Digest of the Week in

★Starred items are digested at right.

NEWS ARTICLES

AUTO PRICES

What's Administered? — Auto leaders give Senators a lesson in competition. Prices and profits are defended. GM given a pat on the back. American Motors' George Romney dissents. P. 77

AIRCRAFT STEEL

Hot Work—Steels that once were available only as die blocks are now in sheets for the aircraft and missile field. High temperature requirements are creating a new steel demand. P. 80

BELT GRINDING

Aims for Sheet Mills — This year automakers went 100 pct for belt grinding of car bumpers. Now the grinding industry is going after a new market—polished hot-rolled sheet as a substitute for cold-rolled. P. 84

COMPUTERS

New Auto Proving Ground—The day may not be far off when electronic brains replace testing labs and proving grounds. GM engineers have already tested steering apparatus and engines with a computer. P. 94

FEDERAL HELP

On the Way—Defense spending and other Federal funds and projects will ease the current business

Metalworking

CASTINGS DECISION: Buyer shown on the cover (for names see P. 127) furrows his brow justifiably when examining a ferrous casting sample. The factors he must consider include design, specifications, and processing. P. 127

slide. End of the recession may come earlier than you have been led to believe. P. 99

STEEL IMPORTS

They Hurt Western Mills—Steelmakers in the Farwest are getting more concerned about the rising tide of imported steel. In five years they've jumped about 90 pct with an increase of 20 pct coming in 1957 alone. P. 101

FEATURE ARTICLE

HOW TO GET MORE FOR YOUR CASTINGS DOLLAR

In Ferrous Metals—What value American industry gets from ferrous castings depends a lot on the knowledge of those who design, specify, buy, and use the foundry's product. Non-users, too, should know something of the hidden values in castings. Number 13 in the Metalworking Dollar Series gives a run-down on how to get better castings at lower cost. P. 127

A Versatile Method — Deciding how a part should be made depends on balancing a number of factors. Heading the list from a functional standpoint is freedom of design. Economic advantages go back to the benefits of producing a complex part as a single unit. P. 128

Choosing Your Alloy—For almost every combination of properties and conditions, there's a ferrous alloy. In some cases the choice is clear-cut; most of the time it takes a fine hand and thorough knowledge of what each type will do and cost. P. 129

Design Is Key—The designer has to consider how molten metal flows, as well as how design affects foundry practice. A number of basic design principles apply to all castings. They help lower costs right from the start. P. 135

Heat Treating — What happens after the casting is made may decide how investment pays off. One of the more valuable steps is heat treatment. Welding, joining, and machining deserve careful study. P. 142

MARKETS & PRICES

PLASTICS IN MISSILES

Get Important Jobs—Reinforced plastics are getting the call for many missile parts. Their resistance to shock and insulating qualities make them valuable for space age jobs. P. 85

METAL POWDERS

Detroit Leads the Way — The auto industry remains the single best customer for parts made from metal powders. However, new developments are helping the industry broaden its potential. P. 86

STEEL CAPACITY

A 5.4 Pct Increase—Steel firms spent a record $1.75 billion in 1957 to add 7.3 million ingot tons to their capacity. Despite financing problems and business slowdowns, more gains are due in 1958. P. 90

STEEL SALES STABILIZING

Recession Bottoming Out—This month will probably be the low point in the steel industry's market recession. While the end of the decline won't mean an immediate splurge in new orders, some mild pickup is expected in April and May. P. 165

FURNACES

Buy Now and Save—New heating equipment on the market offers economies in fuel costs, plant space, and more efficient operation. Producers forecast a 5 pct price hike by midsummer. P. 166

NEXT WEEK

BUSINESS SURVIVAL

Takes More Than Effort—Some sound rules for meeting and beating competition will be forthcoming next week from John Snyder, chairman and president, U. S. Industries, Inc. His advice may help you keep ahead of the field.

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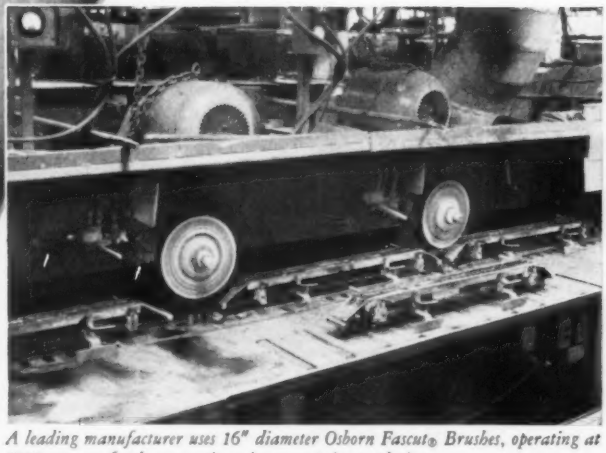
BEFORE BRUSHING

AFTER BRUSHING (prior to plating)



A leading manufacturer uses 16" diameter Osborn Fascut® Brushes, operating at 1700 rpm, to finish automotive trim parts prior to plating.

Smooth start for a perfect finish

THE bright smoothness of metallic trim—adding a final touch of beauty to thousands of products—must start with an equally smooth surface prior to plating.

Makers and users of trim parts find Osborn power brushing methods ideal for removing draw marks, blending imperfections into an unmarred plating surface, materially reducing rejects.

An **O**sborn **B**rushing **A**nalysis, made in your plant and at no obligation, will point out the many ways Osborn power brushing can improve your metal finishing operations. Write *The Osborn Manufacturing Company, Dept. F-66, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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BRUSHING METHODS • BRUSHING MACHINES • POWER, PAINT AND MAINTENANCE BRUSHES • FOUNDRY PRODUCTION MACHINERY

How Armco 17-4 PH Stainless gives shafts longer life at low cost

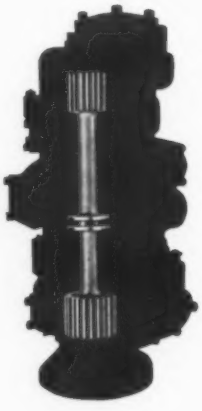
Armco 17-4 PH Stainless Steel is specified for shafts like these because it provides an unusual combination of high strength and hardness, good corrosion resistance and excellent fabricating characteristics. Where operating conditions are severe, designers have found this special Armco Stainless Steel assures economical and long, unfailing service.

High Strength Plus Corrosion Resistance

Mechanical properties of 17-4 PH show why it can be used to make shafting and other critical parts stronger, more resistant to galling and wear.

Typical Properties Armco 17-4 PH Bar (Hardened at 900 F for 1 hour)

Ultimate tensile strength, psi	180-210,000
0.2% Yield strength, psi	165-200,000
Elongation in 2", %	8-17
Hardness, Rockwell	C40-45
Endurance limit, psi (100 million cycles)	80,000



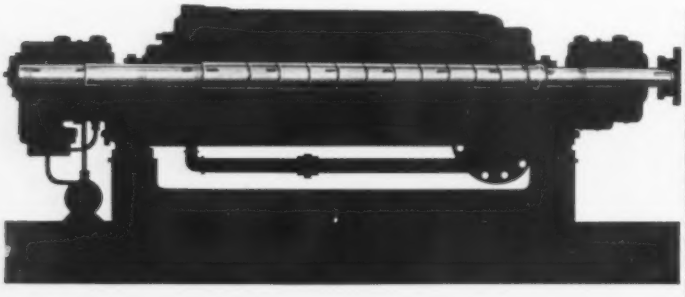
Excellent properties up to 900 F also extend the advantages of 17-4 PH to elevated-temperature applications.

In addition to high strength, this special stainless offers good corrosion resistance. It is much better than that of the hardenable chromium grades and as good as Type 302 under many conditions.

Simple, Low Cost Fabrication

Armco 17-4 PH is readily machined, forged or welded. Hardening requires only 1 hour at 900 F. This low temperature heat treatment, by eliminating scale and minimizing distortion, permits most parts to be finish-machined before hardening.

For parts of *your* products that require ultra-high strength plus corrosion resistance, consider the many design and production advantages of Armco 17-4 PH Stainless Steel. It is available in bar, wire and billets. Just fill out and mail the coupon for complete information.



ARMCO STEEL CORPORATION
1528 Curtis Street, Middletown, Ohio

Send me information on Armco 17-4 PH Stainless Steel

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ARMCO STEEL

ARMCO STEEL CORPORATION, 1528 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

Anti-Americanism: Growing Close to Home

While we spend money and energy far from home, trouble is brewing on our own doorstep. What is happening may forecast bad news for many American business people.

The Canadian government has scheduled an election next month. A major issue with the Conservatives—now in power—is doing business with the United States.

Canada's Conservatives have made it plain that they hope to increase business with Great Britain by at least 15 per cent. That would mean an equivalent reduction in Canadian imports from the United States.

There seems to be a good chance that the Conservatives will win the election. If they do, the whole course of American relations with Canada may take quite a different turn from what it has been in recent years.

While we face this probable hurdle to the north of us another headache is brewing to the south of us. With a new power in Venezuela there are already signs that some former political exiles who are flocking back home to Venezuela are anything but pro-American. This seems so despite qualifying statements after some of them have discovered they may have gone too far and are scaring American business.

Public statements by left-wing leaders in Venezuela indicate a pattern which could possibly spell trouble for American business in Venezuela as well as discourage those who intend to do business there. So far, these politicians are not in power. It may be a year or two before elections are held. During that time cooler heads may prevail and eliminate the thinly-veiled anti-American attitude in some quarters.

The main point here: Two of our biggest customers are having second thoughts about doing business with us. Canada has very definite ideas toward doing much less business with us while some leading Venezuelan politicians are at least toying with the idea of revising our present relationships.

While we do not have full control over the position we are finding ourselves in, we are partly responsible. We have not done our Western Hemispheric homework for years.

It is time we spent more time in bettering relationships to the north and south of us before it is too late. That is just as important as so-called foreign aid and is a whole lot closer to home—in more ways than one.

Tom Campbell

Editor-in-Chief

What makes

V-Belts with the Green Seal

your best belt buy—

by far

A Special tension members of steel cable or exclusive, synthetic Triple-Tempered (3-T) Cords—carefully tempered with Tension, Temperature and Time for maximum strength with minimum stretch.

B Tension and compression sections of mildew-inhibited rubber compounds—designed to the job—and manufactured to team perfectly with whatever type load-carriers are used.

C Envelope of exclusive, bias-cut fabric impregnated with a minimum dusting, mildew-inhibited, friction-balanced rubber compound for long running without sticking or grabbing in the grooves.

—AND IT PAYS OFF IN

Dimensional Stability for belts that don't shrink or stretch in storage — for matched sets that *stay* matched

High Strength and Low Stretch on the drive — for maximum resistance to shock loads — minimum creep and take-ups

Clean, Smooth-Running Operation for maximum trouble-free, horsepower hours of operation — lowest possible power transmission costs

—SO NEXT TIME YOU NEED V-BELTS

— be sure you get belts with the Green Seal. See your Goodyear Distributor for details. Or write Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

DIMENSIONALLY STABLE V-BELTS with the GREEN SEAL by

GOODYEAR

60 GOODYEAR ANNIVERSARY

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Watch "Goodyear Theater" on TV—every other Monday, 9:30 P.M., E.S.T.

Green Seal—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

LETTERS FROM READERS

Best Wishes

Sir—Your editorial page is always magnificent, and as I read the editorial of Jan. 9 "What About The Future—Is The Picture Totally Black?" I recall that I meant to write you on your Jan. 2 editorial "Every New Year Is Tough—Don't Let This One Throw You."

It would be grand if they could be syndicated and run in newspapers to have a much wider circulation.

With the best of good wishes to you for this new year which, to me, appears to be one that will separate "the boys from the men" and "the men from the boys."—P. E. Rentschler, Pres., The Hamilton Foundry & Machine Co., Hamilton, O.

Columbia, Too

Sir—Thank you for your excellent article entitled "How You Can Build A Market in Venezuela" in the Nov. 1 issue of The IRON AGE. I am presently residing in Colombia, and I consider this article quite appropos for this country also.

Will you kindly send me 12 copies of this article? I would like to forward a few copies to the American Institute for Foreign Trade (my alma mater) for their information.—J. K. Meneely, Jr., Armco Colombiana, S. A., Barranquilla, Columbia.

▪ Copies are on the way.—Ed.

Ore Reduction

Sir—We were much interested in the article by Mr. Unterweiser in the issue of Jan. 30 entitled "New Process Reduces Iron Ore With Carbon Monoxide." In order to study this matter further, we would appreciate your help in furnishing us with whatever printed references may be available. If there are no printed references available, we would like to know the names and addresses of suitable correspondents. — J. A. Kearney, Group Leader-Development, Crucible Steel Co. of America, Pittsburgh.

▪ Inquiries should be sent directly to Stora Kopparberg Corp., 230 Park Ave., New York 17, N. Y.—Ed.

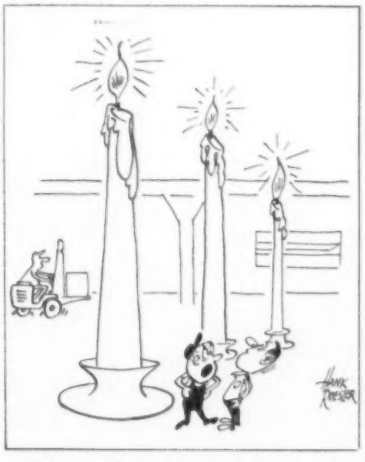
Cost Cutting

Sir — Please send a reprint on "How To Plan For Lower Costs" which appeared in the Dec. 12 issue of The IRON AGE. This is certainly an excellent article and we are looking forward to receiving the reprint.—R. N. Giersch, Plant Engr., The American MonoRail Co., Cleveland.

Tap Life

Sir—On p. 35 of your Jan. 16 issue we read with a great deal of interest, the item "New Design Boosts Tap Life." We would like to obtain additional information about this new tap design. Could you identify the designer for us so that we might write for additional information?—R. A. Smith, Vice Pres. and Sales Mgr., Hy-Pro Tool Co., New Bedford, Mass.

▪ Write to Beloit Tool Corp., Beloit, Wisconsin.—Ed.



"You distinctly said — 'Install 30-ft candle illumination!' "

When bearings must be replaced . . . "almost the same" is always wrong!

There is a difference in precision, fit-up and clearance of bearings carrying the same part number and Bearings, Inc. experts know which bearing will give you longer service life on any application.

This knowledge, plus the immediate availability of all types of bearings used by industry, guarantees that you get the bearing best for each application! They will be "factory fresh". . . incorporating the latest design and manufacturing advancements.

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FATIGUE CRACKS

Low Pressure

If you will come with us to the Waldorf we will take you behind the scenes at one of the lowest-pressure press conferences our people have ever attended. No prepared speeches, no charts, no dramatic presentation of the product and its outstanding advantages.

Instead, the company's senior vice-president, General Harold George (USAF, ret.,) got up and announced that he had been allowed ten minutes to tell us about the new computer being made by Thompson - Ramo - Wooldridge Products, Inc. He proceeded to take 25 minutes explaining how Ramo-Wooldridge had put a million bucks (they call it a megabuck) into a commercial process control computer. They didn't want to give up any stock, he said, so they persuaded Thompson Products to put up another megabuck to get it rolling.

Long Run—About the computer itself, the general said he couldn't possibly tell us what it did or even if it worked—but he did know it ran a hell of a long time without busting down and this fellow Manildi had better darn well sell some because he, the general, had stock in the company and he would like to make a few bucks. Not to hog the business because Burroughs and IBM and the other fellows have to live too, he graciously conceded.

Manildi was properly introduced as general manager of the company. He has a B.S. and an M.S. and a Ph. D. and he knows how the computer works. Since the parent company, Ramo - Wooldridge, is systems engineer for the Atlas, Thor, and Titan missiles and has boosted its sales from zero to $43 million in four years, the doctor is in good company.

Oh, the computer? Very sturdy. Costs $98,000. With power brakes, power steering, installation etc., it runs from $200,000 to $500,000—should pay for itself in cases studied so far in one to three years; sometimes less than one year.

Namesake

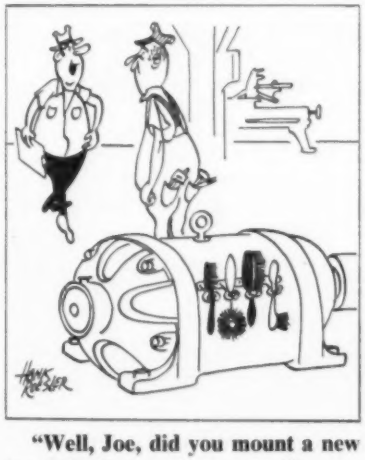
The name "Iron Age" carries a lot of weight in Europe as well as America. A particular "Iron Age" is going to carry a lot of weight, too, between the continents—14,500 gross tons, to be precise.

How come? "Iron Age" is the name of an ore-carrying motorship launched January 27 by shipbuilders Harland & Wolff on Scotland's River Clyde. It is one of a series of 72 ore carriers in which B.I.S.C. (Ore), Ltd. is a partner, B.I.S.C. being a co-operative trading organization buying ore for all British steel mills. Owners of the vessel are the Vallum Shipping Co.

Was the compliment to America's leading metalworking journal intended? It was, and is duly acknowledged in these pages.

New Puzzler

A man and wife each weighing 160 pounds have two sons each weighing 80 pounds. They want to cross a river in a boat which will carry no more than 160 pounds. They all can row. How do they manage to get across and leave the boat on the far side? (This one is off limits to Charlsie and Co.)



"Well, Joe, did you mount a new brush holder on that motor?"

This Stamco installation takes a 10,000 pound coil 48" wide, maximum 12 gauge, and shears it into sheets 2 feet to 15 feet long at variable speeds of 50 to 150 feet per minute.

for
cut-to-length
line
equipment
see

Stamco

SAVE WITH STAMCO CUT-TO-LENGTH LINES

STAMCO cut-to-length line equipment gives you a more efficient and cost-reducing operation. You cut steel the way you want it, when you want it, with easy change-over and with a great reduction in scrap. With Stamco you can store steel in coils rather than sheet bundles, reducing inventory and space. It is a proven fact that a STAMCO installation can PAY FOR ITSELF in a short period of time. Write or call us today for details.

Stamco, Inc., New Bremen, Ohio, U. S. A.

EXHIBITS, MEETINGS

AtomFair '58—March 17-21, International Amphitheatre, Chicago. (International Atomic Exposition, Architects Bldg., Phila. 3.)

Packaging Machinery and Materials Show—March 25-28, Convention Hall, Atlantic City, N. J. (Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22.)

Design Engineering Show—April 14-17, International Amphitheatre, Chicago. (Clapp & Poliak, 341 Madison Ave., New York 17.)

FEBRUARY

Institute of Surplus Dealers—Annual trade show and convention. Feb. 14-17, New York Trade Show Bldg., New York. Society headquarters, 673 Broadway, New York 12.

American Institute of Mining, Metallurgical & Petroleum Engineers—Annual meeting, Feb. 16-20, Hotels Statler and Sheraton-McAlpin, New York. Society headquarters, 29 W. 39th St., New York.

Assn. of Iron & Steel Engineers—Western meeting, Feb. 24-26, Hotel Statler, Los Angeles. Society headquarters, 1010 Empire Bldg., Pittsburgh.

MARCH

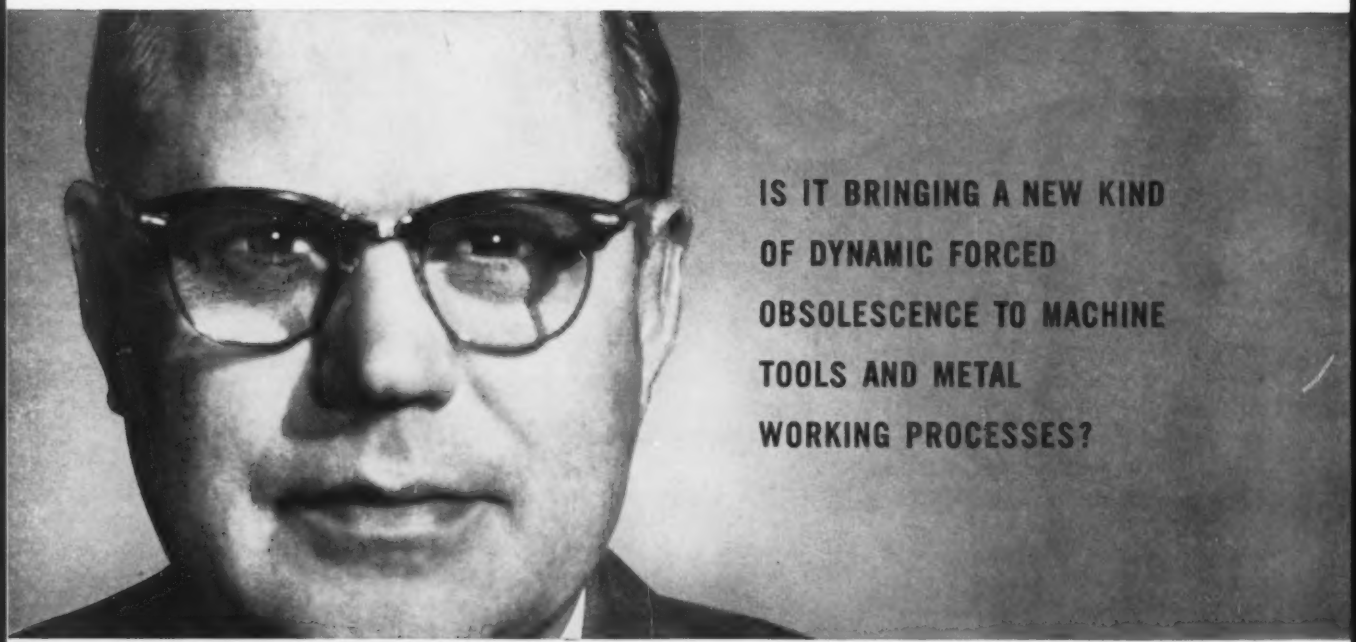
Can Manufacturers Institute, Inc.—Annual meeting, Mar. 3, Waldorf-Astoria Hotel, New York. Society headquarters, 1413 K St., N. W., Washington.

American Machine Tool Distributors' Assn.—Spring meeting, March 10-11, The Roosevelt, New Orleans, La. Society headquarters, 1900 Arch St., Philadelphia, 3.

Pressed Metal Institute — Spring technical meeting, Mar. 12-14, Sher-

(Continued on P. 16)

The bright new era belongs to those who



C. R. DE VLIEG, Executive Vice President, DeVlieg Machine Company.

Here at Fair Street, we think that the answer unquestionably is "yes."

We have felt it already, as you must have, too, in your business. The evidence is everywhere indicating that we are racing into the greatest industrial revolution of all time. We are backing our own conviction with the dollars it takes to build the new highly efficient plant you see pictured here.

Technological progress of the last 10 years more than equals any previous 50 years in the history of mankind.

And still, relentless research goes on. One breakthrough into new areas of science and engineering is quickly followed by another. New materials, new methods, new processes, higher accuracy control and most significant of all, *vast product changes affecting every business are in the making.*

From it all is emerging what virtually amounts to a new philosophy in running a metalworking business. The basic tenets now are clear to those who expect to control their own destiny in the bright new, bitterly competitive era ahead.

The old "needs" now are becoming "musts." Greater flexibility in design and production to meet competitive product changes can no longer be ignored. The need for shorter time cycles and lower inventories is imperative. Already, old established theories of obsolescence are being knocked into a cocked hat. And the time is fast approaching when no shop can afford costly boring jigs and fixtures or the intolerable months of lead time required to manufacture them.

DE VLIEG MACHINE COMPANY, 450 FAIR STREET

plan for it . . .

SOME OF OUR JIGMIL USERS

Allis Chalmers Mfg. Co.
Aluminum Co. of America
American Can Co.
American Machine & Foundry Co.
Avco Manufacturing Corp.
Barber-Colman Co.
Bendix Aviation Corp.
Boeing Airplane Co.
Borg-Warner Corp.
Brown & Sharpe Mfg. Co.
Bucyrus-Erie Co.
Cameron Machine Co.
Carbide & Carbon Chemicals Co.,
A Div. of Union Carbide and Carbon Corp.
Carrier Corp.
Caterpillar Tractor Co.
Chance Vought Aircraft, Inc.
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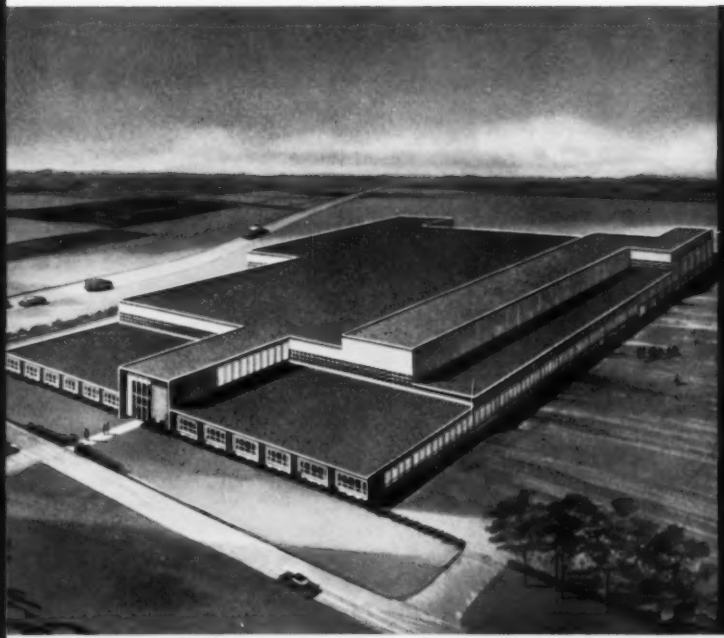
Clark Equipment Co.
Continental Can Co., Inc.
Continental Motors Corp.
Control Instrument Co., Inc.
Convair, A Division of General Dynamics Corp.
Curtiss-Wright Corp.



New 130,000 sq. ft. Jigmil plant to be completed in June.

WILL YOU BE THE NEXT
TO VISIT FAIR STREET

DeVlieg

SPIRAMATIC JIGMILS®

ACCURATE HOLES AND FLAT SURFACES
IN PRECISE LOCATIONS

Fortunately, our amazing Jigmil supplies answers to many of the new "must solve" problems involved in design flexibility, time cycles, and costly inventories. Many case histories show that savings usually cover its cost in a few months. Savings resulting from reduced inventory alone often are enough.

Few people believe the claims we make for this machine. We know they sound fantastic. But 90% of the men who come to Fair Street to see a demonstration buy Jigmils.

Now while you and we have a breather period, will you come, too? Come simply to watch. The Jigmil does the selling. And we promise answers that will pay off handsomely for you—*proved in advance.* A Deferred Payment Plan is available, if desired.

Dana Corp.
Douglas Aircraft Co., Inc.
Eaton Mfg. Co.
Fairbanks Morse & Co.
Fairchild Engine & Airplane Corp.
Food Machinery & Chemical Corp.
Ford Instrument Co., Div. of Sperry Corp.
Ford Motor Co., Aircraft Engine Div.
General Electric Co.
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Goss Printing Press Co.
Holley Carburetor Co.
Ingersoll-Rand Co.
International Business Machines
International Harvester Co.
Jeffrey Mfg. Co.
Joy Mfg. Co.
The Glenn L. Martin Co.
National Machinery Co.
North American Aviation, Inc.
Northrop Aircraft, Inc.
The Oliver Corp.
Speco Division, Kelsey-Hayes Co.
Sperry Gyroscope Co.
Thompson Products, Inc.
United Aircraft Corp.
Warner & Swasey Co.
Western Electric Co., Inc.
Westinghouse Electric Corp.

FERNDALE • DETROIT 20

EXHIBITS, MEETINGS

(Continued from P. 13)

aton-Cadillac Hotel, Detroit. Society headquarters, 3673 Lee Rd., Cleveland 20.

National Assn. of Waste Material Dealers, Inc.—Annual convention Mar. 15-18, Waldorf-Astoria, New York City. Society headquarters, 271 Madison Ave., New York.

Steel Founders' Society of America—Annual meeting, Mar. 17-18 Drake Hotel, Chicago. Society headquarters, 606 Terminal Tower, Cleveland 13.

National Assn. of Corrosion Engineers—Annual conference and exhibition, Mar. 17-21, Civic Auditorium, San Francisco. Society headquarters, 1061 M&M Bldg., Houston.

International Acetylene Assn.—Annual spring convention, Mar. 19-21, The Bellevue-Stratford Hotel, Philadelphia. Society headquarters, 205 E. 42nd St., New York.

American Hot Dip Galvanizers Assn., Inc.—Annual meeting, Mar. 27-28, Penn Sheraton Hotel, Pittsburgh. Society headquarters, 1806 First National Bank Bldg., Pittsburgh.

APRIL

Concrete Reinforcing Steel Institute—Annual meeting, Apr. 6-12, The Boca Raton Hotel, Boca Raton, Fla. Society headquarters, 39 S. Dearborn St., Chicago.

Wire Reinforcement Institute, Inc.—Annual spring meeting, Apr. 7-8, Hotel Boca Raton, Boca Raton, Fla. Society headquarters, National Press Bldg., Washington.

Industrial Fasteners Institute—Annual meeting, Apr. 8-10, Boca Raton Hotel, Boca Raton, Fla. Society headquarters, 1517 Terminal Tower, Cleveland.

60-inch, 4-stand tandem cold reduction mill at McLouth Steel Corporation, Detroit, Michigan

BLAW-KNOX COLD STRIP MILLS

Blaw-Knox designs and builds all types of cold reduction and temper mills for ferrous and non-ferrous work. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations including all auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron and steel rolls, Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

BLAW-KNOX

BLAW-KNOX COMPANY

Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

Modernize your v-belt drives with

TAPER-LOCK SHEAVES

–proved in over a million installations!

- **No flange. No collar.** ***It's different.***
- **Always a perfect fit on shaft— tight as "shrunk-on."**
- **Easy on — easy off.**
- **Complete range of sizes. A, B, C and D grooves, in stock.**
- **Just tighten the screws that wedge the bushing. Simple, isn't it?**
- **Try it—and you'll standardize on it!**

Taper-Lock Sheaves, with their precision machining, team up with matched Sealed-Life V-Belts to insure steady performance and unusually long belt life.

DODGE MANUFACTURING CORPORATION, 800 Union St., Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new methods. Look for his name under "Power Transmission Machinery" in your classified phone book, or write us.

DODGE
of Mishawaka, Ind.

THE "BUFFALO" UNIVERSAL IRON WORKER

NOTCHES
PUNCHES
SHEARS
MITERS
SLITS CUTS COPES

takes the space of one machine, does the work of six—FAST!

The compact, multi-purpose "Buffalo" Universal Iron Worker saves space, time and work. It occupies the space of only *one* machine, yet performs up to *six* operations. The UIW will handle up to three jobs *at once*, thus saving much labor and time in conveying work.

The versatile "Buffalo" Universal Iron Worker is available in several models for cutting, punching, notching, shearing, slitting, coping, mitering—without changing tools. It quickly and easily handles angles, tees, channels, bars and flats.

The heavy electrically-welded steel plate frame, rugged construction throughout and one-shot lubrication system insure a long life of efficient, dependable service. Easy to set-up, easy to operate, the "Buffalo" Universal Iron Worker will speed up production and maintenance in your shop as it has in hundreds of others.

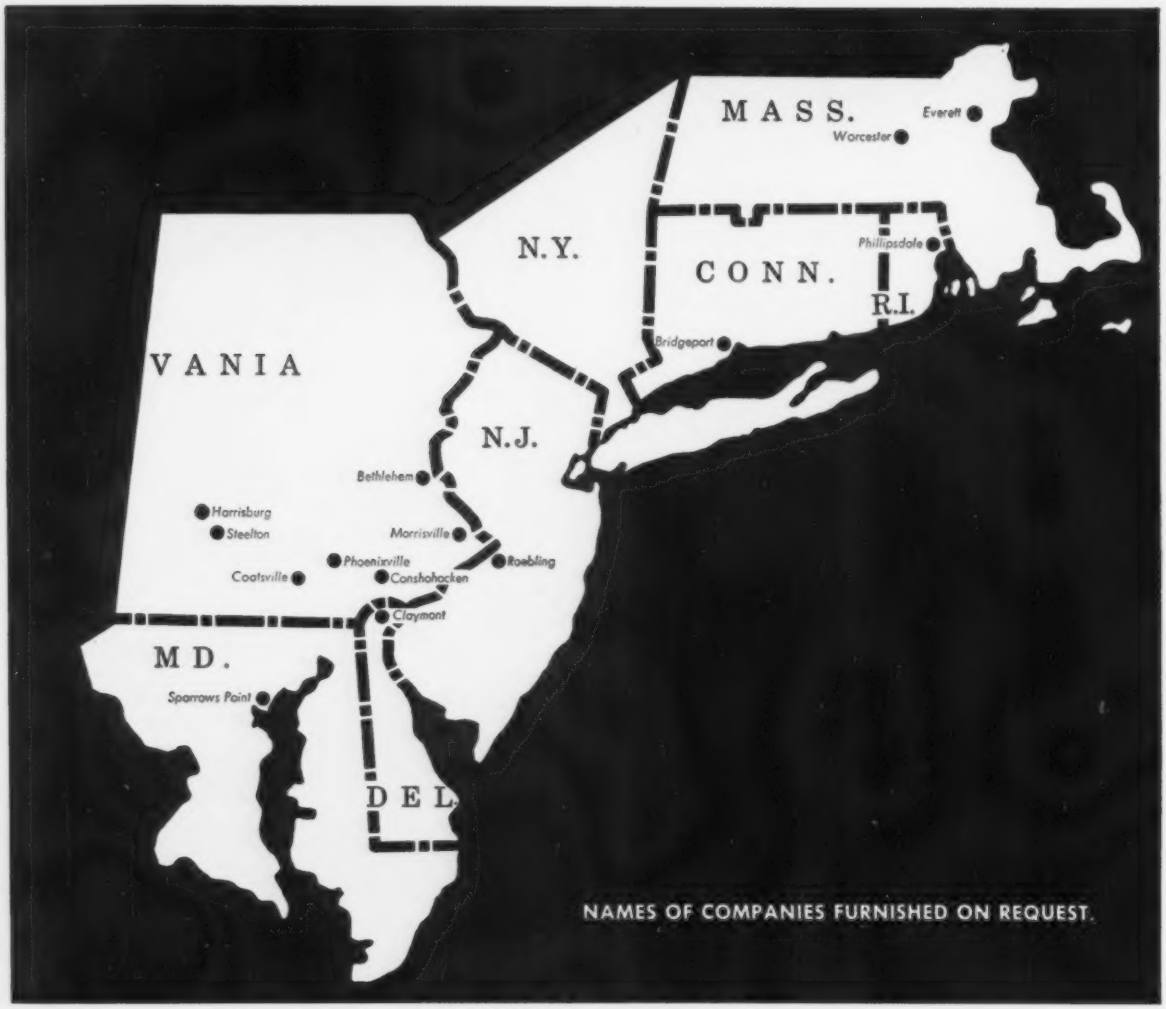
Contact your "Buffalo" machine tool dealer for a demonstration of the UIW—see how it can streamline *your* shop operations. Or, write for Bulletin 360-G for full details.

Every "Buffalo" product brings you the extra "Q" Factor value-bonus—the built-in QUALITY that provides trouble-free satisfaction and long life.

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

BUFFALO FORGE COMPANY
492 BROADWAY • BUFFALO, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING
PUNCHING
SHEARING
BENDING



Permanente #165 was chosen for 74 out of the last 90 rammed furnace bottoms installed in this area! Reasons: longer life, fewer repairs, less down time . . . advantages pioneered by—

For complete information,
ask for valuable installation manual "Permanente 165 and 84 Ramming Mixes for Open Hearth Furnaces."

Call or write Kaiser Chemicals Division, Dept. R-7161, Kaiser Aluminum & Chemical Sales, Inc., at any of the regional offices listed below:

PITTSBURGH 22, PA. . . . . 3 Gateway Center
HAMMOND, IND. . . . . 518 Calumet Building
OAKLAND 12, CALIF. . . . . 1924 Broadway

KAISER CHEMICALS

PIONEERS IN MODERN BASIC REFRACTORIES

REFRACTORY BRICK AND RAMMING MATERIALS • CASTABLES & MORTARS
MAGNESITE • PERICLASE • DEADBURNED DOLOMITE • ALUMINAS

We can help

you "fit"

WIRE CLOTH

to your needs

These days, "fit" is an appropriate word when it comes to matching wire cloth to industrial needs—especially when you do business with the *Reynolds Wire Division* of National-Standard. Here's why . . .

First, there are of course the many different weaves, meshes, metals, finishes and coatings that provide for infinite combinations to meet any special requirement right on the nose.

Secondly, and highly important, Reynolds also "tailors" wire cloth to the precise *width* and *length* needed to minimize waste and to shave the last bit of excess cost out of production operations.

Finally, Reynolds helps you take the fullest advantage of these variables by providing truly unmatched engineering and analytical service . . . nation-wide. Can wire cloth do a *better* job for you? Can you cut costs? Could wire cloth be the answer for certain *new* requirements? Check with Reynolds . . . see what *Reynolds* service and quality control offers!

NATIONAL NS NATIONAL STANDARD **STANDARD**

DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; *fine wire, stainless, music spring and plated wires* • WORCESTER WIRE WORKS, Worcester, Mass.; *music spring, stainless and plated wires, high and low carbon specialties*
WAGNER LITHO MACHINERY, Secaucus, N. J.; *metal decorating equipment* • ATHENIA STEEL, Clifton, N. J.; *flat, high carbon spring steels* • REYNOLDS WIRE, Dixon, Ill.; *industrial wire cloth*

premium on purity

From the cow to the container, the purity and delicate flavor of dairy products must be protected. Dairy equipment made of stainless steel resists corrosion, imparts no odor to the product and is easy to keep clean and sterile. The highest quality dairy equipment is designed, improved and protected with McLOUTH STAINLESS STEEL.

specify

McLOUTH STAINLESS STEEL

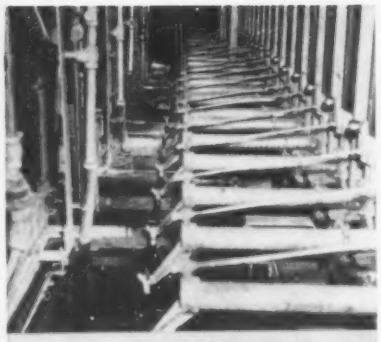
HIGH QUALITY SHEET AND STRIP

for the dairy industry

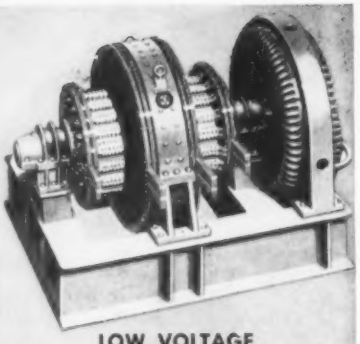
McLOUTH STEEL CORPORATION DETROIT, MICHIGAN

MANUFACTURERS OF STAINLESS AND CARBON STEELS

GERMANIUM AND SELENIUM RECTIFIERS

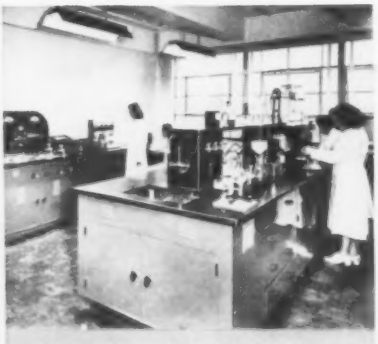


PROCESSING EQUIPMENT



LOW VOLTAGE GENERATORS

CONTROLS



LAB AND FIELD SERVICE

FINISHING SUPPLIES

EVERYTHING FOR ANODIZING

H-VW-M is your *one source* for supplies, equipment – and the best service anywhere!

Whether you're setting up a new aluminum finishing shop, or enlarging or modifying existing facilities, you can fill *all* your needs at H-VW-M. That's because H-VW-M is the one company combining a complete engineering service with a full line of equipment and supplies for modern aluminum finishing.

Here's an idea of what you can get, anytime, from H-VW-M:

- **ELECTRICAL EQUIPMENT** – a full line of both Germanium and Selenium rectifiers, 6 to 48 volts, remote and self contained models, with a wide choice of controls. Or a wide range of low voltage generators.
- **STILL TANK OR FULL AUTOMATIC EQUIPMENT** – whatever you need, from a single component to a complete, integrated system.
- **ALUMINUM FINISHING SUPPLIES** – new compounds, improved cleaners, and H-VW-M "*Job-Tailored*" Buffs, to give you top economy in every finishing step.
- **ENGINEERING SERVICE AND INSTALLATION**—*one responsibility*, all the way. H-VW-M engineers and technicians are specialists in anodizing equipment, with years of experience behind them.

"DIAL-A-CYCLE" MEANS *AUTOMATED ANODIZING* – set the dial, and the H-VW-M automatic conveyor does the rest! One operator can anodize or electroplate a number of different parts, each requiring its own special finish, treatment, or color. Carrier follows dial setting, lowers parts into right tank for right period, bypasses others—automatically. Save on production time, labor, capital investment.

For all information, write to Hanson-Van Winkle-Munning Company, Matawan, New Jersey. Offices in principal cities.

H-VW-M

PLATEMANSHIP—Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing – of a complete equipment, process and supply line for every need.

4761

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

HIGH PURITY MAKES THE DIFFERENCE

Electrolytic Manganese Improves Melting Practice

Stainless steel makers have found electrolytic manganese to be a great aid in simplifying melting operations, minimizing impurities, and facilitating closer control of composition, particularly for producing the new 200 series with higher manganese content.

Electrolytic manganese can also be used advantageously for the production of non-ferrous alloys, including high-temperature and electrical resistance alloys of aluminum, copper, and zinc. It is free of elements which adversely affect the properties of non-ferrous alloys.

ELECTROMET electrolytic manganese is ideal for all applications requiring manganese metal of very high purity and low iron content. It has a minimum purity of 99.9 per cent on a metallic basis and is the thickest plate commercially available. For stainless steels requiring nitrogen for austenite stabilization at hot-working temperatures, ELECTROMET also offers a nitrogen-bearing grade of electrolytic manganese.

This illustrated folder on electrolytic manganese and technical assistance in the use of ELECTROMET alloys and metals are available on request. Write or phone the nearest ELECTROMET office: Birmingham; Chicago; Cleveland; Detroit; Houston; Los Angeles; Phillipsburg, N.J.; Pittsburgh; San Francisco. In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Toronto. ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

Cans containing 50 lbs. of ELECTROMET electrolytic manganese are a convenient means of charging high-purity manganese in the production of stainless steel.

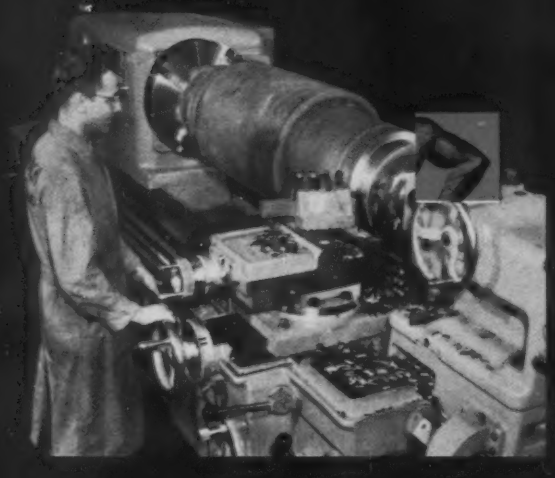
Electromet
FERRO-ALLOYS AND METALS

UNION CARBIDE

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

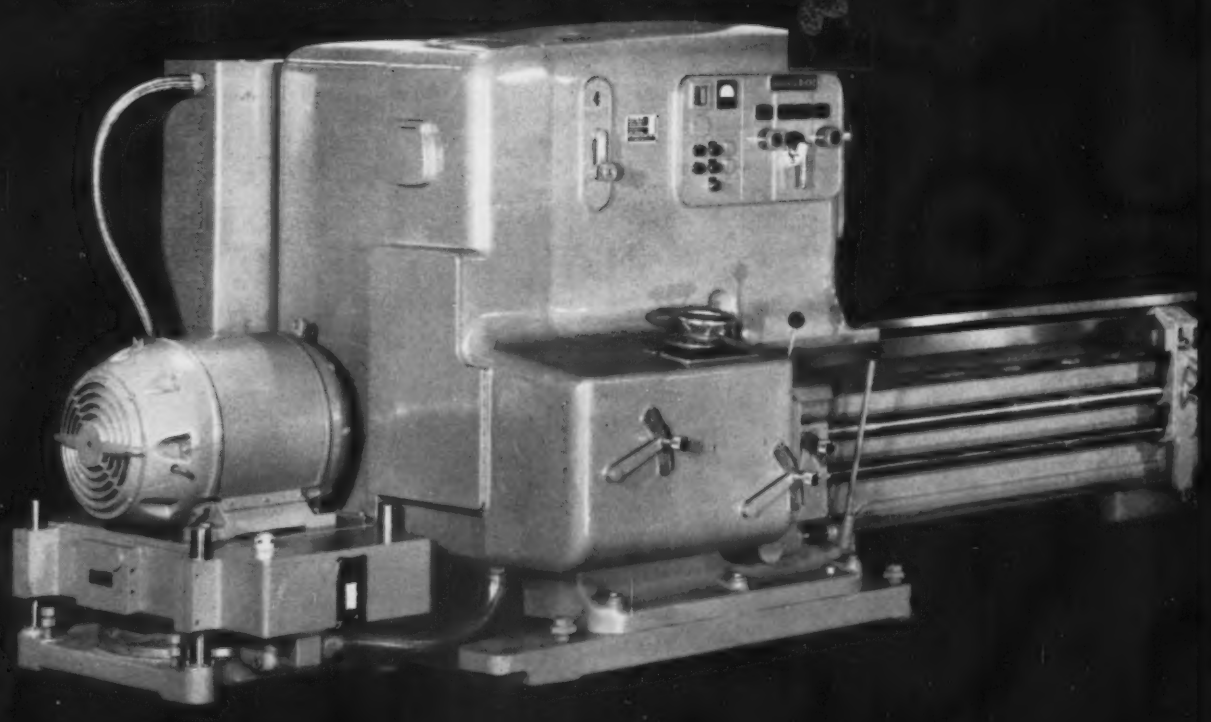
BRAWN

BRAINS



The MONARCH SERIES 90 DYNA-SHIFT HEAVY-DUTY LATHE – Model 2500: Clearance diameter —40″ . . . Swing over cross slide 25″. **Model 2501:** Clearance diameter—44″ . . . Swing over cross slide 31″. **Model 2502:** Clearance diameter—48″ . . . Swing over cross slide 36″.

When progressing from diameter to diameter, speed is changed in a few seconds with the flick of *one* dial. The *machine* calculates each speed and changes speed automatically. And the wide available range assures selection of the *right* speed for the diameter to be turned.



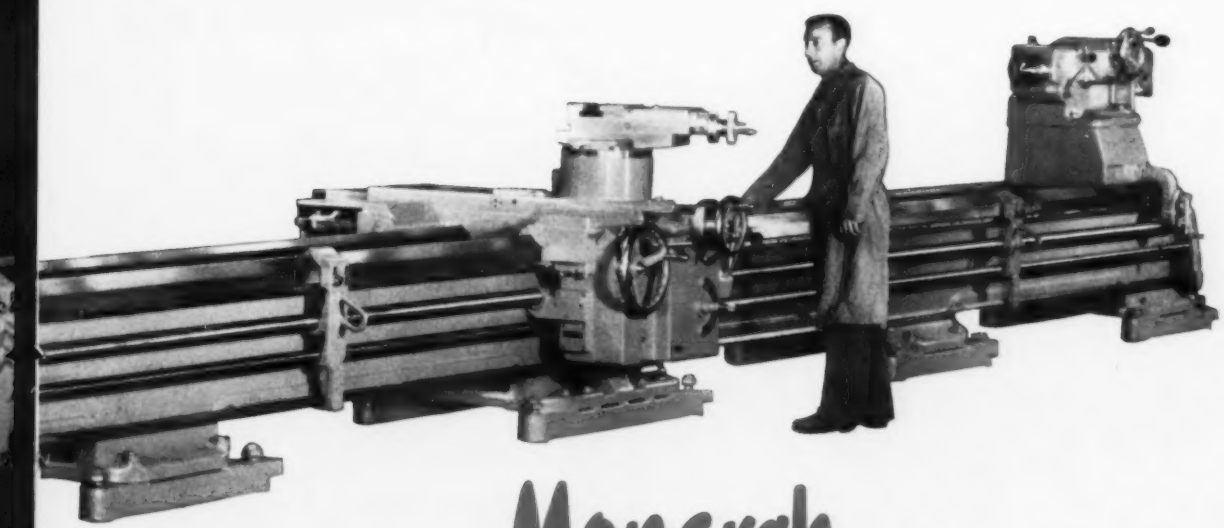
. . . The Monarch Heavy-Duty Dyna-Shift

In a class by itself! Just set the work diameter indicator. In a flash, the exclusive Dyna-Shift drive headstock calculates and delivers the ideal spindle speed (36, from 6 to 750 RPM).

You get strength and power to match the brains. The equivalent of 60 H.P. gives this lathe the power to break and the speed to burn any carbide tool. And the massive design supports the heaviest of cuts.

Now, you can use carbide tooling to its ultimate advantage, with metal removal rates up to 120 cubic inches per minute, turning alloy steel. Always used at proper cutting speed, you get the ultimate in productiveness, maximum tool life, and close accuracy.

Here's a machine you've got to know about, and our twenty-four page illustrated booklet #1601 tells you in detail. Just ask . . . The Monarch Machine Tool Company, Sidney, Ohio.



Monarch

TURNING MACHINES

ACCURACY • ECONOMY • LONG LIFE

FOR A GOOD TURN FASTER . . . TURN TO MONARCH

No matter which *FINISH* you like—you can buy it in

MicroRold® QUALITY STAINLESS STEEL

2D—A silvery white, but non-lustrous, surface produced by annealing and pickling cold reduced material. Steel sheets & strip in this condition are most ductile and the surface holds lubricant well for severe drawing operations.

2B—Steel in the 2D condition which is subsequently rolled on a "skin pass" or temper mill. The surface acquires a bright finish from the polished rolls. This surface is somewhat more dense and hard than 2D and is a better starting surface for later finishing and buffing operations.

No. 3—This surface is made by grinding with a No. 100 abrasive. This surface is smooth but not as reflective as 2B.

No. 4—A finer finish than No. 3 made by grinding with a No. 150 abrasive. Like No. 3, this surface is easily blended with hand grinders after forming, drawing or welding.

No. 7—Good reflectivity and brilliance made by polishing with a No. 400 abrasive. This semi-mirror finish must be protected during fabrication by adhesive paper or strippable plastics lest the finish be marred beyond repair.

BRIGHT—A highly reflective surface made by cold reducing with highly polished, glass-hard rolls. This finish is only available in Type 430 stainless.

These are our standard surface finishes that are available in types 201, 202, 301, 302, 304 and 430 except Bright which is type 430 exclusively.

These finishes are regularly supplied in sheet and coil form in widths up to 48 inches.

Since Nos. 3, 4, 7 and 430 Bright are smooth reflective surfaces, they are not recommended for severe drawing without special precautions as the mill finish may be marred. Applications such as dairy machinery, kitchen and restaurant equipment and architectural decorative work require only local forming, so these highly polished surfaces are not greatly disturbed. All mill polished sheets are carefully packed to avoid handling imperfections. Protective adhesive paper can be specified by the buyer when needed.

For specific information on recommended surface characteristics for a particular stainless steel sheet and strip application, address your request to our Product Development Dept.

WASHINGTON STEEL CORPORATION — MicroRold® — STAINLESS — SHEET & STRIP

Washington Steel *Corporation*

Producers of Stainless Sheet and Strip Exclusively

2-L WOODLAND AVENUE, WASHINGTON, PA.

Self-aligning

FOR LONGER LIFE

Not even misaligned shafts or supports impair the efficiency of this easy-to-mount LINK-BELT roller bearing

THE equipment manufacturer seeking lower manufacturing costs plus the ultimate in free-rolling efficiency need look no further than this Link-Belt roller bearing.

- **SELF-ALIGNMENT** compensates for inaccuracies in machining and assembly of equipment.
- **EASY MOUNTING.** Bearing is securely and quickly locked by a heavy collar to commercial shafting.
- **COMPACTNESS** offers design flexibility.

You'll find equally important economies throughout industry's most complete line of ball and roller bearing blocks. Ask any one of 40 Link-Belt offices or your authorized stock-carrying distributor for Book 2550.

Series 400 roller bearings

FREE ROLLING—SELF ALIGNING. Spherical inner ring aligns freely in any direction. Load is distributed over entire roller, assuring full capacity. Destructive edge loading cannot occur.

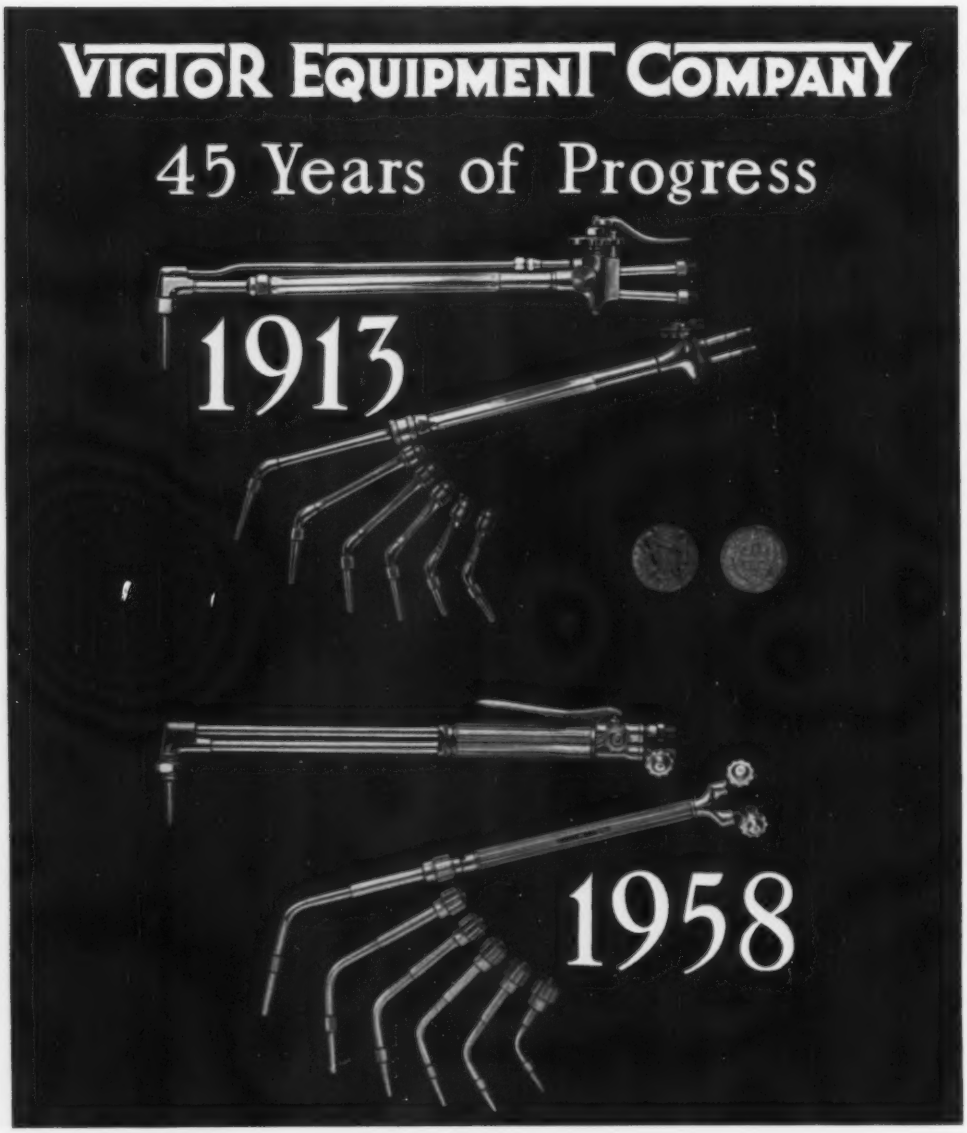
LINK LB BELT

self-aligning ball and roller bearings

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N S W.; South Africa, Springs. Representatives Throughout the World. 14.440

VICTOR EQUIPMENT COMPANY

45 Years of Progress



QUALITY . . . SERVICE

VICTOR for welding

the original Victor welding and cutting torches were created in 1913 to fill the need for better and safer equipment—torches that were practical, versatile and built to last—created to be a victor in the field.

Victor torches were an immediate success—they were designed with the user in mind by L.W. Stettner, a skilled and experienced pioneer welder who knew the needs of the men who work with torches—the design was so efficient and well thought out that few changes have been made since that time.

Victor safety regulators were created in the same pattern—to fill the need for safe, reliable, and practical equipment for the man in the field.

the success and popularity of Victor today is solidly based on the application of those principles under active leadership of the original inventor and founder.

VICTOR EQUIPMENT COMPANY *SAN FRANCISCO LOS ANGELES CHICAGO*

How can you bear being up a tree?

If grinding wheel problems have you in a bearish mood—or even out on a limb—stop growling. Switch to CINCINNATI (PD)° WHEELS. For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that can *save you money* . . . and *increase your production.*

Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS *are priced no higher than ordinary wheels.*

So, if you want the bare, down-to-earth facts on how to save money and increase production, contact your CINCINNATI Grinding Wheels distributor. Or, contact us direct and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

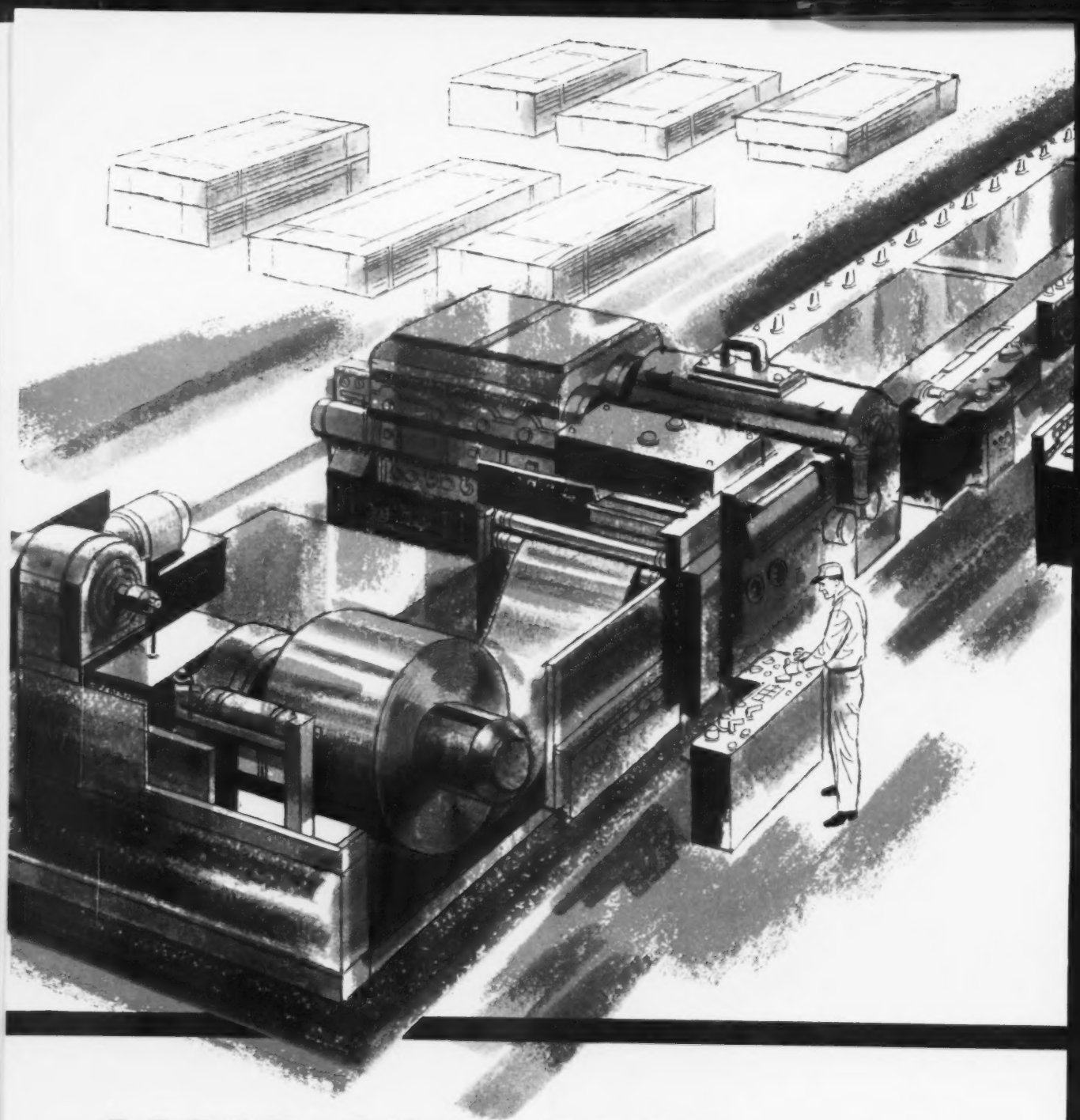
Remember—*only* CINCINNATI Grinding Wheels give you . . .

(PD) POSITIVE DUPLICATION

CINCINNATI° *Grinding Wheels*

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

°Trade Mark Reg. U. S. Pat. Off.



ALLIS-CHALMERS

CONTROL...

from furnace to finish

Advanced, Coordinated Control for your Shearing Line

SHEARING LINE CONTROL — Here's advanced, dependable control for fast, smooth acceleration and deceleration. You get complete synchronization from reel to piler with finger-tip response. Variable voltage control featuring magnetic amplifiers and constant potential control are integrated with ac and dc motors into a smoothly functioning system.

Regardless of your needs, you can get control equipment from Allis-Chalmers designed to meet your specific application. Allis-Chalmers builds control not only for rough, tough furnace and main mill applications, but control to provide the precise coordination required for processing lines and also equipment for accurate regulation and exacting performance of finishing mills.

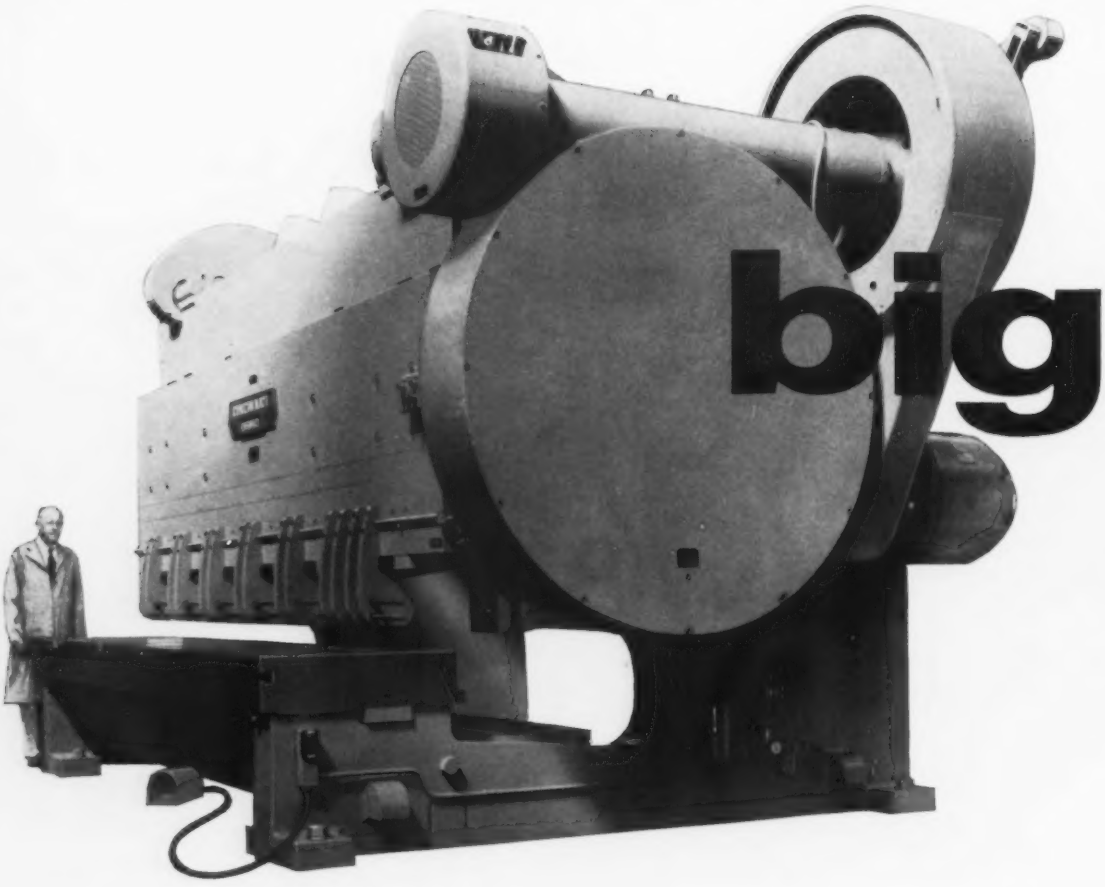
Special study is given to each application so that control components are properly integrated to provide maximum output with minimum downtime. In addition, Allis-Chalmers has the specialized knowledge to coordinate control throughout your entire mill.

If you want to learn more about control designed to meet your specific mill requirements, call your nearest A-C representative or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

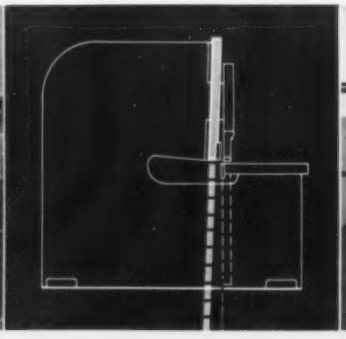
A-5513



Typical Cincinnati Shears: **big** series 15012, capacity 1½", 12'; **small** series 1004, capacity 3/16", 4'; **in between** series 1810, capacity ¼", 10'.

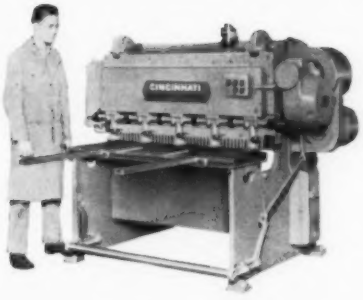
All steel, interlocked construction—no welds used as load supports

Hydraulic holddowns exert tons of pressure, insure accuracy

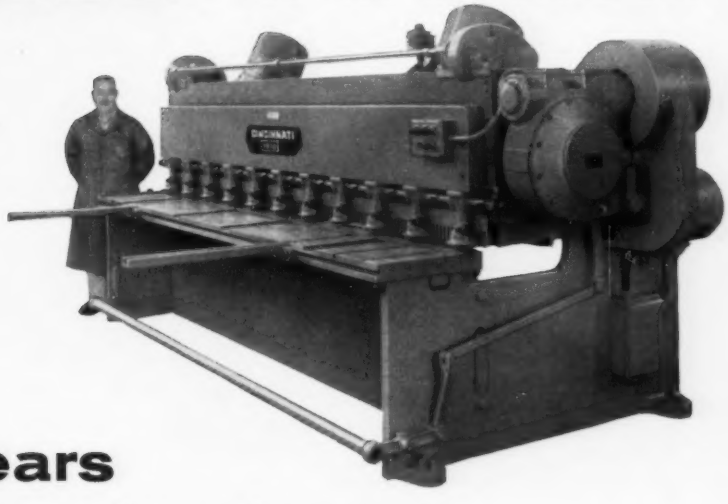


Non-float inclined ram maintains extremely accurate knife clearance

Front controlled power back gage is standard, accurate, convenient



small or in between



Cincinnati Shears give you every advantage

Simple operation, micrometer accuracy, cost-cutting speed, all-steel construction, and versatility—these are the advantages which make Cincinnati Shears earn their way in your plant.

And, whether you're shearing steel or plastics, nonferrous metals or asbestos, wire mesh, clad metals, or even radioactive material, the Cincinnati Shear line gives you a range of choices to fit your own requirements. Cincinnati Shears are in service cutting all of these materials.

Cincinnati ruggedness enables you to use one knife clearance for all thicknesses up to machine capacity.

Power operated back gages which are standard equipment, reduce non-productive time. Hydraulic holddowns provide tons of pressure, insure accuracy. The inclined ram permits the economy of four-edge knives, keeps work from binding between back gage and lower knife.

Since gap frames are standard, you can do notching, slitting or shearing work longer than the machine on any Cincinnati Shear to the limit of its gap.

Be sure to get the full Cincinnati story before you buy your next shear. Write Dept. B for Catalog S-7R.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

Highway building across the country
...is sped by an electric arc

All over the nation, you can see vast new roads being built. Rugged machines dig . . . scrape . . . haul . . . dump . . . to make your superhighway take shape.

Producing road-building machines involves special problems for their makers. Here, LINDE lends a hand. With UNIONARC welding equipment, heavy steel sections are joined with joint areas stronger than the steel itself.

Each of LINDE's different welding methods is designed for certain types of jobs. One is for joining metals that ordinarily are difficult to weld. Another gives sound seams in very thick steel. UNIONARC welding, a method recently developed by LINDE, permits welding down-hand, vertically, or overhead—with savings up to 50%.

For half a century, LINDE has been engaged in research, development, and production of welding machines and methods, for both gas and electric operation. For information on UNIONARC, and a copy of the booklet, "Modern Methods of Joining Metals," write or call your nearest LINDE office.

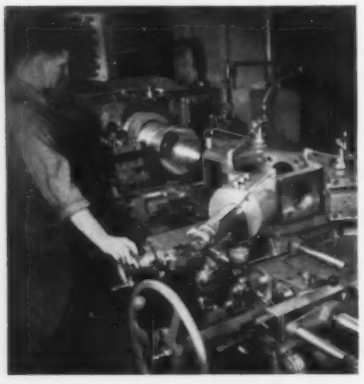
LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. *In Canada:* Linde Company, Division of Union Carbide Canada Limited.

For the best in electric welding—look to LINDE!

Linde
TRADE MARK
UNION CARBIDE

Electric arc welding methods developed by LINDE are used to help make tough and durable road-building machines for building the nation's highways.

letters from production men . . .



Cost Savings: 47%

For maximum production at reduced costs, the taper attachment on a 7A Jones & Lamson Turret Lathe has proved to be invaluable. Our type of manufacturing is mostly of a small quantity, job-shop nature, but we do manufacture large quantities of tapered sleeves.

The original method for producing these sleeves called for a bar-feed turret lathe to rough out the blanks with an engine lathe being used to finish bore and ream the internal taper and turn the external taper.

Our present method specifies boring and turning both tapers on a 7A Jones & Lamson Turret Lathe with no subsequent engine lathe operation. This results in a cost savings of approximately 47%.

The old method resulted in double handling, high cost, and wasted floor space. The new method, using the Jones & Lamson taper attachment, assures accurate, concentric tapers at a minimum cost.

— Planning Engineer —

Little things paid off

Of course J & L turret lathes have all the major requirements of a good machine tool — Rigidity, Power, Accuracy; but I believe their superiority is due to the little things that pay off in production, such as the J & L feature: "Automatic Internal Delivery of Coolant to Each Turret Position".

Here is how this feature paid off in the chasing of 1" – 8" Class II threads on long forged and heat treated stress rods and bolts. On other equipment these parts were threaded at 23 R.P.M., with a tool life of about 4 hours. Thus, two tool changes were required per shift. When the job was shifted to a J & L turret lathe it was possible to pipe the coolant directly into the die head, so that the coolant intimately flooded all cutting edges and carried both the heat and chips away from the cutting area. This permitted a 350% increase in cutting speed, and with only one tool change required every 2½ shifts. This resulted in a real cost reduction, and the increased speed produced a superior finish on the threads.

— Production Supt. —

Accuracy improves 60%

The Jones & Lamson No. 3 Universal Ram Type Turret Lathe with spindle speeds up to 1500 R.P.M. enables us to use high velocity turning with carbide tools, which we feel is a big factor in the reduction of cost per piece manufactured. Also the single lever carriage and turret feed selector have been big factors in reducing machine time. The rigidity of this machine helps us attain tolerances of .0005", which must be held in the work we constantly perform on these machines. Since the installation of six of this type of machine our production and quality of work has improved about 60 to 70%.

— Machinist —

Saved $30 per part

Our new J & L 10B Turret Lathe, with its cross slide and power indexing turret with multiple stop stations, will save us $30.00 per part, or 50% of present cost over any other available machining method.

— Director of Purchasing —

Saved $40,000 a year

The #5 Jones & Lamson Turret Lathe with Hydraulic Tracing Attachment has given us quality, production, and savings on contour machining of Stainless Steel Forgings.

This contour was originally rough machined, then traced in separate operations.

With the improved method, the Jones & Lamson Hydraulic Tracing Attachment is mounted on the back slide, leaving the front slide free to use the square and hex turrets for rough machining.

These parts are now rough and finished machined in one operation, saving $40,000 per year.

The work piece is located on a face plate fixture weighing 80 lbs. and traced with a carbide tool at a spindle speed of 1040 R.P.M. and a feed rate of .00125 I.P.R.

The 30 micro inch finish and .001 of an inch tolerance required on this contour is maintained only because of the rugged construction and built-in accuracy, characteristic in all Jones & Lamson products.

— Methods Engineer —

Never had a failure

The No. 5-3 Turret Lathe is the only Jones & Lamson machine in our shop. I wish we had more of its kind.

This lathe is most suitable for our type of production, which consists of small series, because it can be set up quickly. We treasure this machine for its accuracy in small and big work.

The "Single Lever Speed Selector" and the "Hydraulic Collet Chuck" are features which are highly appreciated by the operators.

But the appraisal would be incomplete without giving credit to its outstanding ruggedness.

We have run this machine for the past two years at 24 hours a day on a six-day week and never had a failure.

— Tool Designer —

Production increased 4 to 1

The Hydraulic Tracing Attachment which we are using on a No. 5 J & L Ram type Turret Lathe has proved to be the most useful to me as Shop Superintendent. Production has increased four to one since installation of the attachment three years ago. The accuracy of the parts made on the above machine determines the final performance of our product. Before using the Hydraulic Tracer our rejects were high and production was low. The success of the tracing attachment relieved us of one of our major manufacturing problems.

The work performed has to be held to close tolerance. It is the final contouring of Valve Plugs in all grades of stainless steel and hardfaced or heat treated metal. Combined with Masters made from our stock parts and carbide tooling, the cost of templates and tools is comparatively low. The combination of a turret lathe and tracer control also simplifies our setups and results in reduced cost. In fact, the setup time we save by use of masters accounts for fifty percent of our savings.

— Plant Supt. —

Consistent on plunge cuts to ±.002

Our J & L #3 Universal Turret Lathe, once it is set up, constantly repeats on plunge cuts to a ±.002 and on regular forming cuts holds to ±.001 between centers.

This feature allowed us to eliminate a grinding operation, on an ordnance contract part, at a considerable saving. Said part being a steel casting pintle wt. 13# shank end.

We are at present using the lathe for our regular production of conduit fittings and parts, and the knowledge that accuracy is a known factor is quite a morale builder to both management and production.

It is surprising how much respect can be gained between management and production in the use of such equipment, and the satisfaction the production worker is given when he knows he can depend on consistent performance of his equipment.

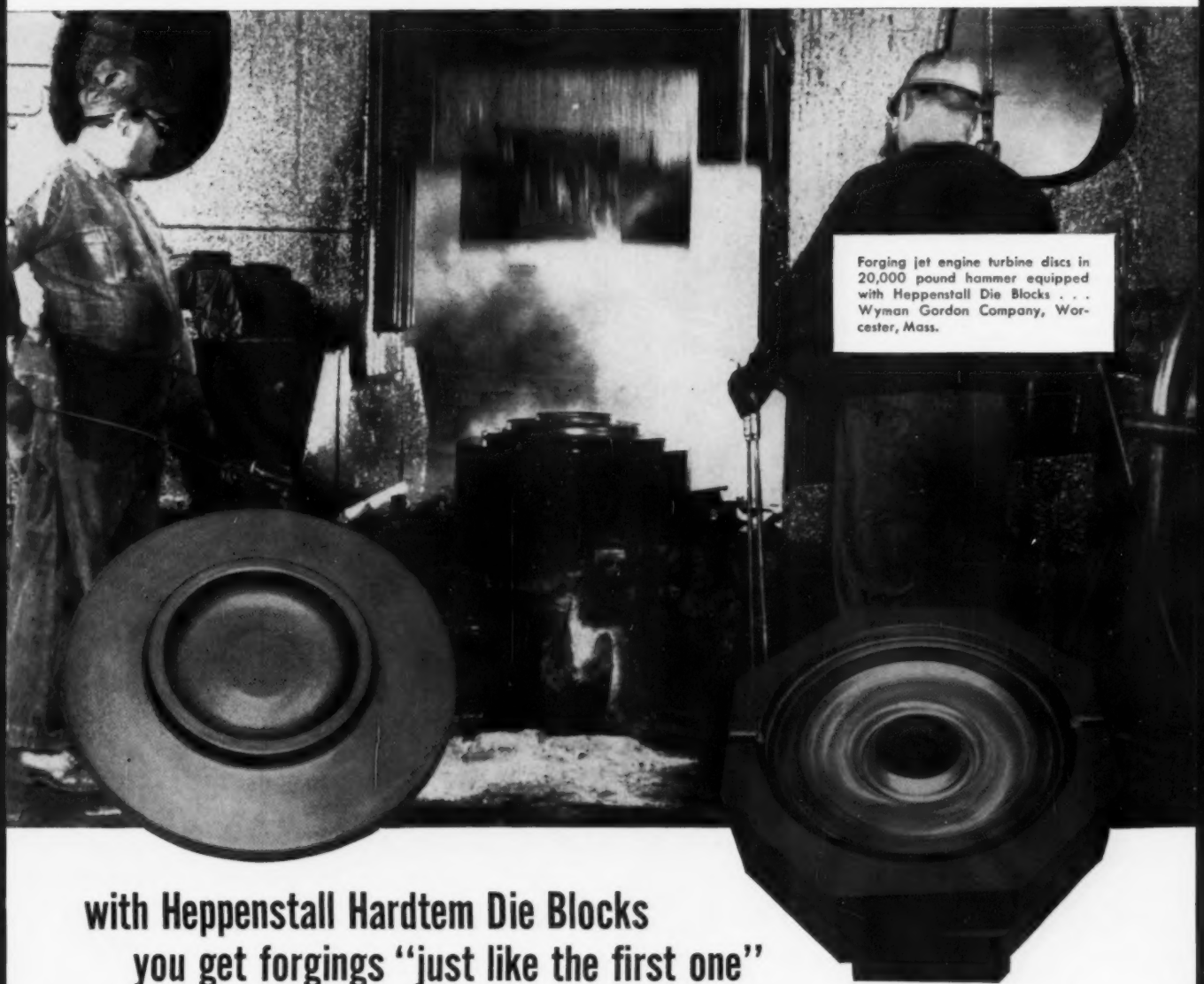
— Plant Engineer —

(names of these customers available on request)

. . . to Jones & Lamson Machine Company

511 CLINTON ST., SPRINGFIELD, VT.

Forgings that FLY *must meet rigid tolerances*



Forging jet engine turbine discs in 20,000 pound hammer equipped with Heppenstall Die Blocks . . . Wyman Gordon Company, Worcester, Mass.

with Heppenstall Hardtem Die Blocks you get forgings "just like the first one"

Tolerances are especially close for these jet engine turbine disc forgings. That's why they're forged in Heppenstall Hardtem Die Blocks. For this job, Wyman Gordon Company selected Hardtem "B" Blocks.

Holding dimensions for long runs is only one of the well known characteristics of Heppenstall Hardtem Die Blocks.

Machinability of Heppenstall Hardtem rates equally high with veteran die sinkers. When they lay out a design on Hardtem, they expect and *get* savings in cutting time, longer tool life, and a more accurate sinking.

Forged on all six faces from special Heppenstall Steel, Hardtem and other Heppenstall Die Steels are manufactured in a wide range of hardnesses to match varying customer requirements of application and machinability. If you're looking for better die block performance, contact your Heppenstall Representative.

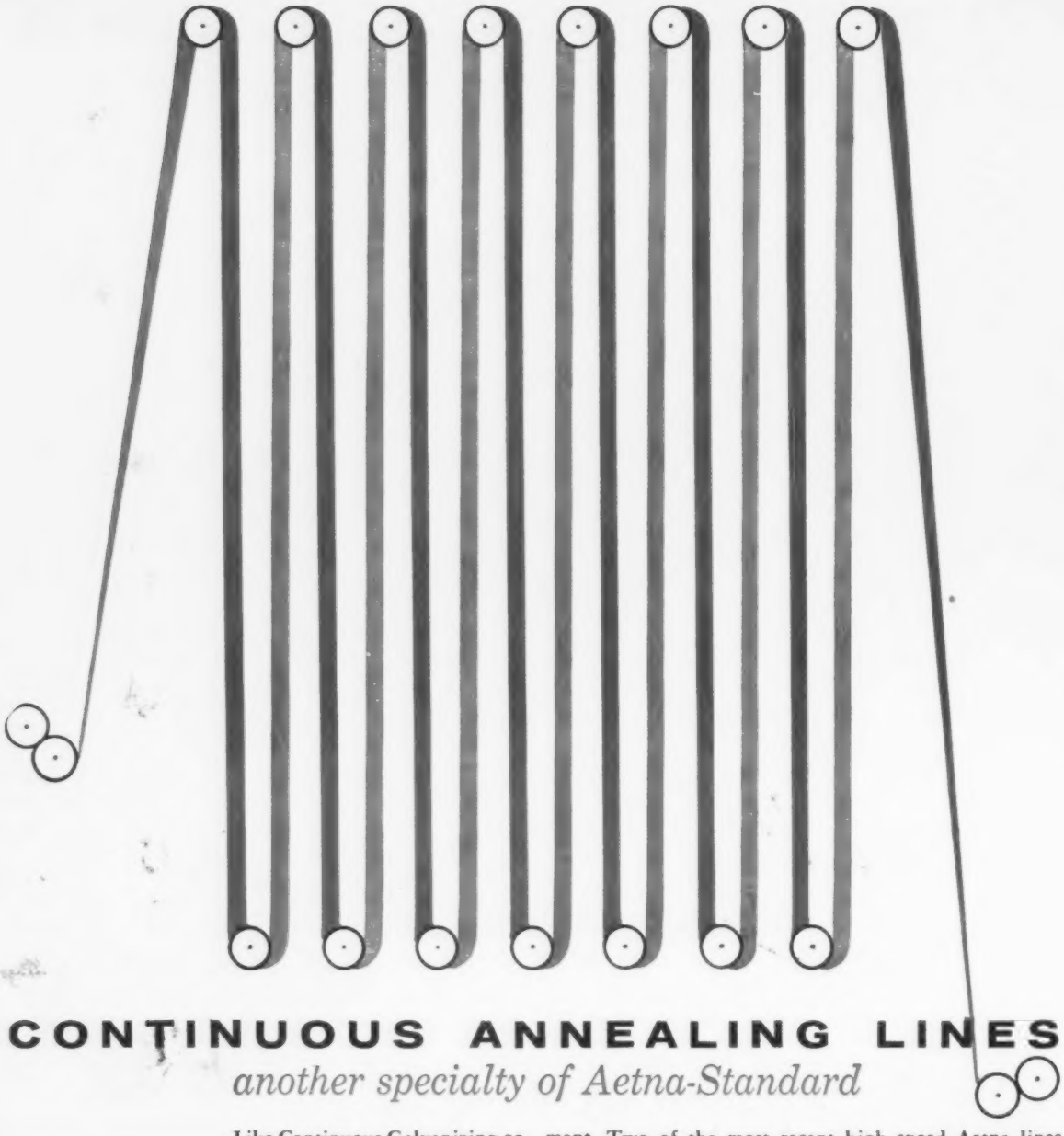
These five Heppenstall Warehouses carry stocks of the most popular size die blocks:

Bridgeport 5, Conn. • Detroit 32, Mich • Indianapolis 27, Ind. • Los Angeles 22, Calif. • Pittsburgh 1, Pa.

HEPPENSTALL

. . . the most dependable name in die blocks

PITTSBURGH 1, PENNSYLVANIA



CONTINUOUS ANNEALING LINES

another specialty of Aetna-Standard

Like Continuous Galvanizing or Tinning, a Continuous Annealing Line requires good designing and rugged equipment.

Aetna has much experience in continuous processing lines, galvanizing, tinning and annealing. In fact, Aetna pioneered in continuous equipment. Two of the most recent high speed Aetna lines incorporate many new ideas and innovations, permitting sure tracking at high speeds of 1,000 feet and more.

What can Continuous Annealing do for your production and your costs? Aetna's sales engineers can produce some interesting figures.

AETNA • STANDARD

THE AETNA - STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. • PLANTS: ELLWOOD CITY, PA., WARREN, OHIO • RESEARCH LABORATORY: AKRON, OHIO

CONTINUOUS GALVANIZING LINES • CONTINUOUS ANNEALING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER, PLASTIC AND CHEMICAL

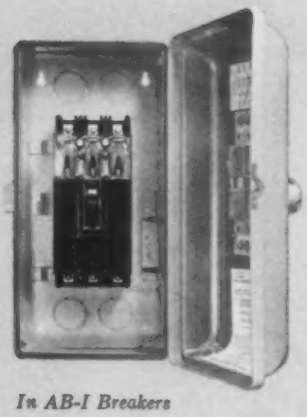
from Westinghouse

LOOK

the contacts are visible!

SAF T VUE

WORLD'S FIRST BREAKER WITH CONTACTS VISIBLE



In AB-I Breakers

In combination Life-Linestarters

Safe, Sure, Protection

They're calling it "the biggest thing in circuit protection since Westinghouse developed the breaker!" You can *see* the contacts are open, or closed, through the heat-resistant thermoplastic window. Yet the breaker is still dead-front, with no exposed live parts.

What's more, the transparent window won't cloud during repeated full-load switching or interrupting—won't cloud even on normal overload interruptions.

In case of a high-value short circuit, the Saf-T-Vue breaker window clouds immediately —giving you visual warning of serious trouble on the line. In this rare instance, the transparent window can be easily and inexpensively replaced.

SAF T VUE *in Westinghouse AB-I Breakers*

Good news for steel mills, automotive plants, *all industry*—Saf-T-Vue is available in Westinghouse AB-I breakers in sizes F through LM. And you can get them in enclosures for every conceivable application.

SAF T VUE *in Westinghouse combination Life-Linestarters*

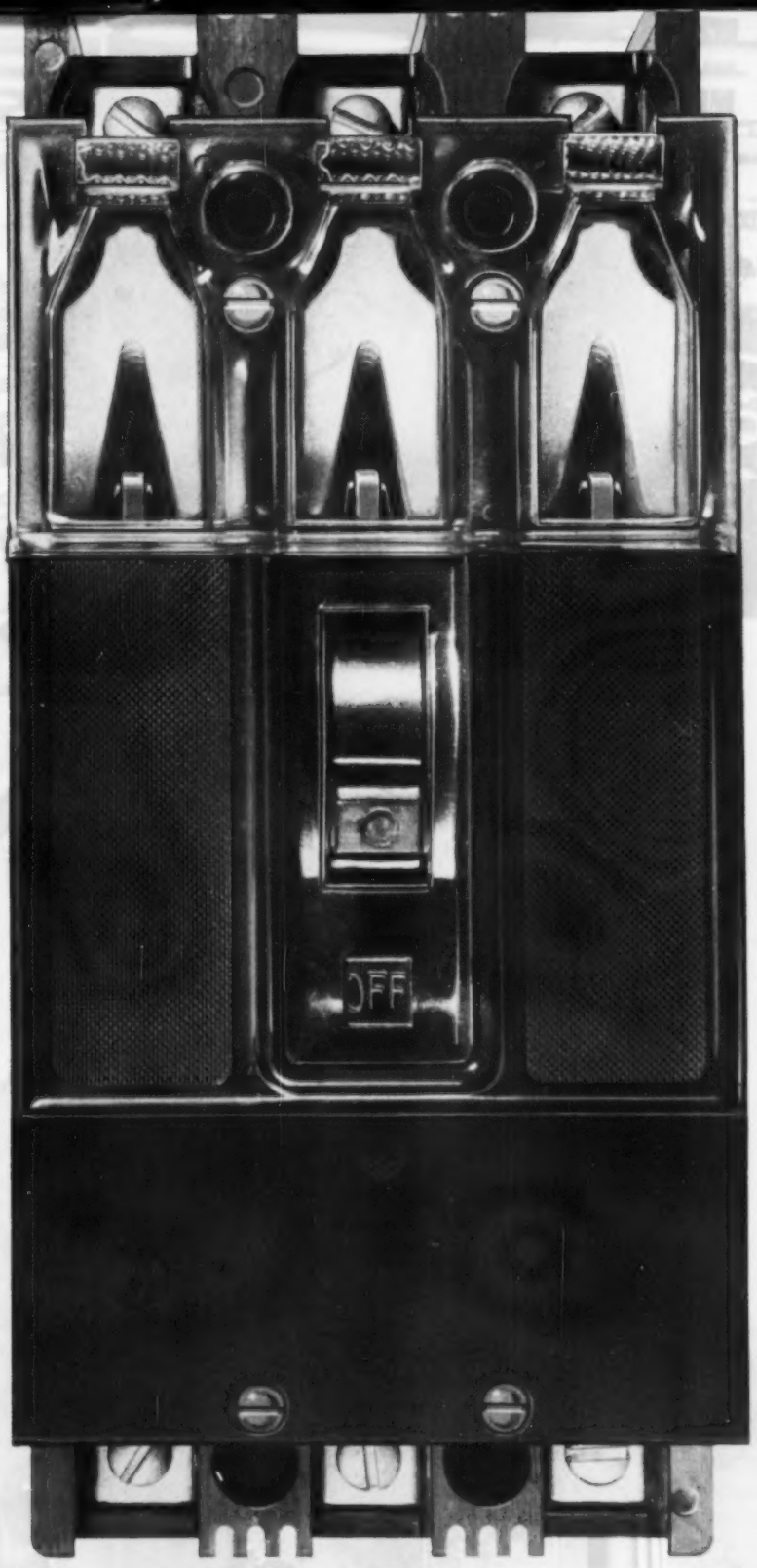
In combination Life-Linestarters*, too! Saf-T-Vue Breakers add one more "plus" to a long line of Westinghouse exclusive features: all front-removable parts; positive De-ion® arc quencher; bimetallic disc overload relay; knife-edge fulcrum that prevents armature sticking or binding; and many, many more—

For complete information on this exciting new Westinghouse development, contact your nearby Westinghouse sales office or distributor, or write Westinghouse Electric Corporation, Standard Control Division, Beaver, Penna.

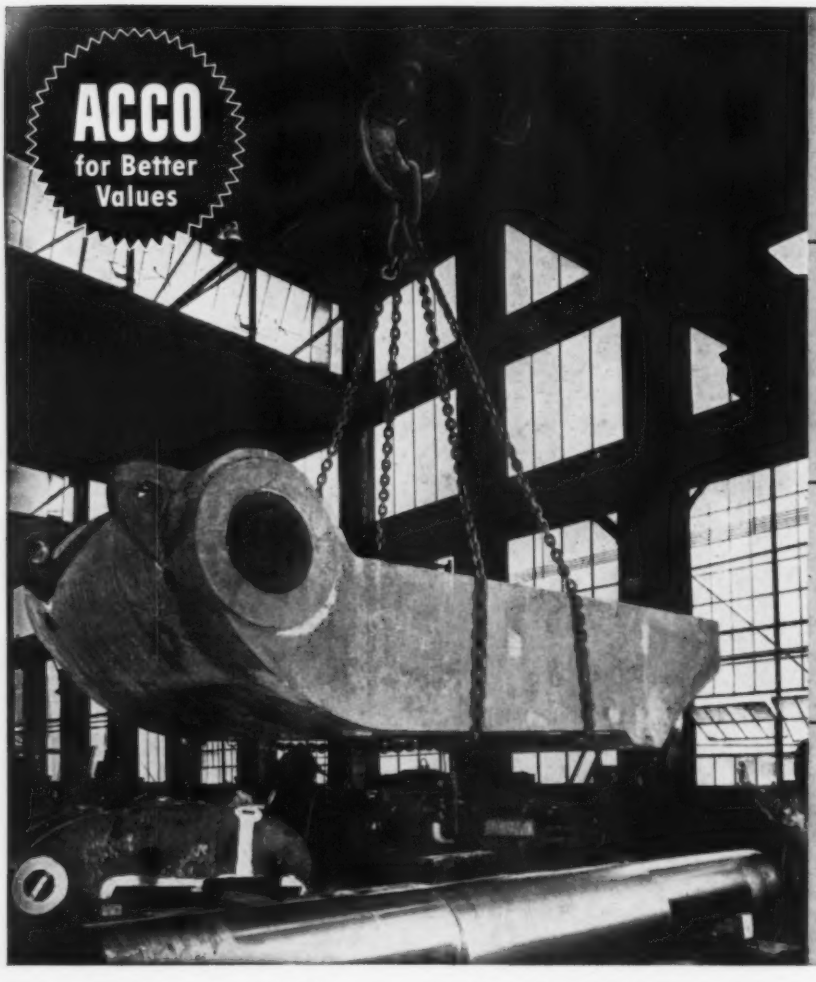
*Trade-Mark

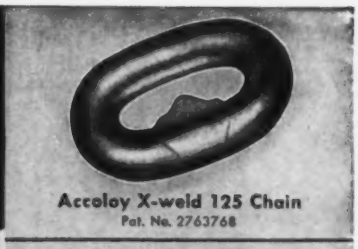
JI-30289

YOU CAN BE SURE...IF IT'S Westinghouse



Westinghouse Electric Corp.
STANDARD CONTROL DIVISION
Beaver, Penna.





Accoloy X-weld 125 Chain
Pat. No. 2763768

New Shaped Master Link

ACCO Registration Ring

Registration Certificate

Big, costly loads are safe with Acco Registered® Sling Chains

• Pictured above is a huge, 35,000-pound casting being lifted *easily and safely* by a 4-leg ACCO *Registered* Sling Chain. Directly beneath the load is a highly polished and machined crank shaft worth many thousands of dollars.

Imagine the cost in lost labor and materials, should the sling chain fail! But it won't fail—for this ACCO *Registered* Sling Chain and all its components have the inbuilt strength needed to handle the job with complete safety!

When you buy an ACCO *Registered* Sling Chain, you get these four exclusive "plus values" which *add materially to the worth, but not to the cost,* of the sling:

1 • **Accoloy X-weld 125 Chain**, for extra strength. This chain hangs straight . . . does not kink . . . has extra resistance to bending.

2 • **New Shaped Master Link**, uniquely shaped to withstand deformation under loads up to 18% greater than a round-section link can do.

3 • **ACCO Registration Ring**, serially numbered as evidence that the assembled sling has been factory proof-tested to twice its working load limit.

4 • **Registration Certificate**, signed by us, attesting to the field-tested design and proof-testing of the complete sling.

Remember, the best sling is one of your most economical material-handling tools. You'll find it good business to consult your ACCO *Registered* Sling Chain Distributor on all your sling needs; his counsel is available without obligation. If you don't know his name, write us at York, Pa.

WHAT "ACCO REGISTERED" MEANS

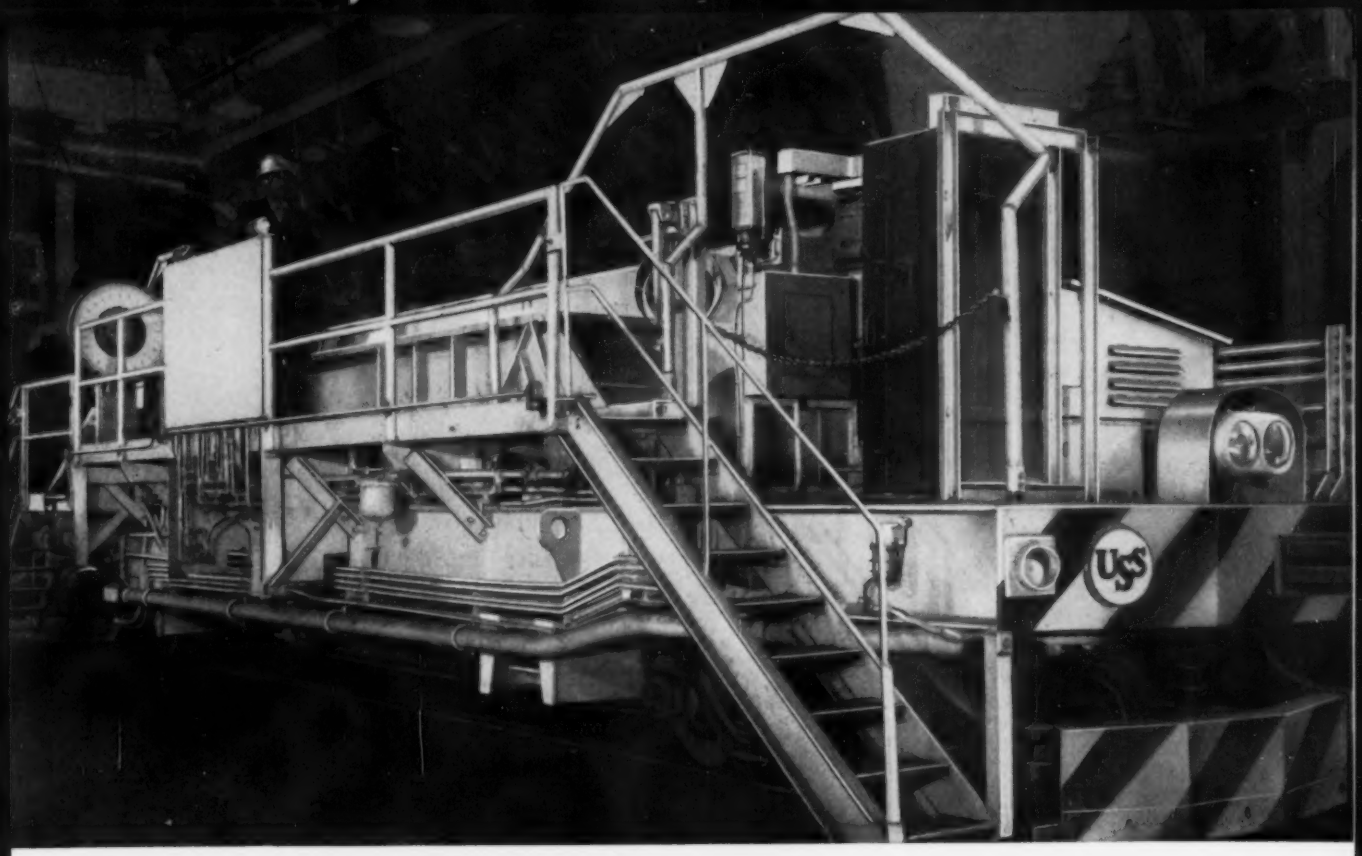
1 The best material
2 Unit safety factor (on bodies, rings, links, hooks)
3 Proof test of complete sling to twice the working load limit
4 Actual field service test of each design
5 Metal identification ring on each sling
6 Signed Registry Certificate with each sling

American Chain Division
AMERICAN CHAIN & CABLE
Bridgeport, Conn. • Factories: *York and *Braddock, Pa.

Sales Offices: *Atlanta, Boston, *Chicago, *Denver, Detroit, *Houston, *Los Angeles, New York, Philadelphia, Pittsburgh, *Portland, Ore., *San Francisco

ACCO
TRADE MARK

*Indicates Warehouse Stocks



Modern scale cars designed to your specifications

HERE is one of the most modern USS*-designed industrial cars in use. It is a self-propelled, automatic, weight-recording car for carrying up to 40 tons of ore and other materials from storage bins to the blast furnace.

Each A.A.R.-type truck has a 75 hp electric-drive motor. The car is all-welded COR-TEN Steel plate construction for strength, with the hopper lined with "T-1" Steel for high resistance to abrasion and impact. Of its large number of safety devices, the "safety interlocks" are especially interesting: one allows the hopper car to be discharged only at the skip hoist and only when skip car is in position; another prevents movement of the car while its gates are open.

The car's most unique feature is its weighing apparatus. The hopper is on hydraulic load-cells which actuate an electronic mechanism as the car is filled. The mechanism operates a scale on which the weight can be read by the operator. The weight is also recorded on two tapes—one for ready reference, and one which is rolled into a locked box to serve as a permanent record of the materials charged into the blast furnace.

The manufacture of industrial cars of all types and sizes is a USS specialty, produced at our Johnstown Works. Our engineers can provide complete designs, if you wish. Our 32-page illustrated booklet, "USS Custom Designed Cars," contains more detailed information. We will gladly send you a free copy. Write today.

**Registered trademark*

United States Steel Corporation, Pittsburgh
Columbia-Geneva Steel Division, San Francisco
Tennessee Coal & Iron Division, Fairfield, Ala.
United States Steel Export Company, New York

United States Steel

United States Steel Corporation
525 William Penn Place, Room 2801, Pittsburgh 30, Pennsylvania

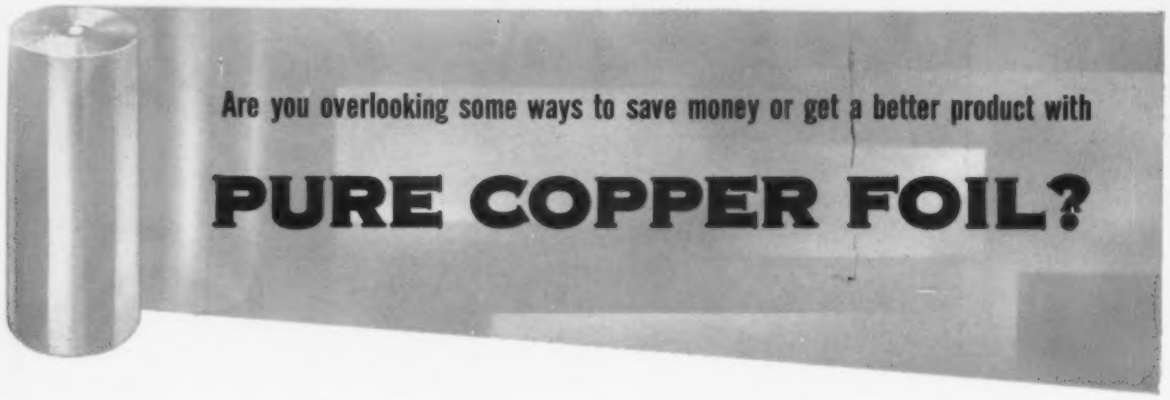
Please send me a free copy of your
32-page booklet, "USS Custom Designed Cars."

Name .....

Company .....

Address .....

City ..... **State** .....



Are you overlooking some ways to save money or get a better product with

PURE COPPER FOIL?

ANACONDA
"Electro-Sheet" Copper Foil

Copper is deposited, under carefully controlled conditions, onto huge rotating drums and stripped off.

GAGES. ½ oz. per sq. ft. (.0007")
1 oz. per sq. ft. (.0014")
2 oz. per sq. ft. (.0028")
3 oz. per sq. ft. (.0042")
4 oz. per sq. ft. (.0056")
5 oz. per sq. ft. (.0070")
6 oz. per sq. ft. (.0084")
7 oz. per sq. ft. (.0098")

WIDTHS. Slit to ordered widths in ½" increments from 6" to 62" trimmed, or 64" untrimmed.

LENGTH. In continuous length rolls, varying by gage. Only limiting factor is weight of full-width roll.

COMMERCIAL QUALITY. Available in the full range of gages.

PRINTED-CIRCUIT QUALITY. Quality carefully controlled to conform with N.E.M.A. Specification for copper foil. Clean, bright surface on one side relatively free from pits, scratches, nodules, and surface inclusions. The reverse side has a matte finish for high bond strength between the base material and the copper. Furnished in gages from 1 oz. per sq. ft. (.0014") to 7 oz. per sq. ft. (.0098") and to exceptionally close gage tolerances of ± .0003" for 1 oz. and 2 oz., and ± .0006" for 3, 4, 5, 6 and 7 oz. weights.

FURNACE-BRAZING QUALITY. Clean and free from surface residues. Furnished in thicknesses from 1 oz. to 7 oz. per square foot.

ELECTROSTATIC SHIELDING. To prevent leakage, in or out, of stray currents which affect the proper functioning of electrical equipment—transformers, radio and TV receiving sets, electrodiathermy equipment – broadcasting buildings, hospital operating rooms, X-ray rooms.

DAMP-PROOFING AND VAPOR SEAL. "Electro-Sheet" is available bonded to high-grade building paper, cloth, or asphaltic compounds —strong, flexible, easy to handle—an economical solution to many varied problems of water-, moisture-, vapor-, and wind-proofing.

GASKETS. "Electro-Sheet" bonded to paper, fabric, or compounds.

CAPPING. For such things as utility poles and fencing to prevent moisture from entering open end pores of wood, causing rot.

CABLE WRAPPING. Bonded to paper or fabric, and corrugated to conform to spiral winding without rupture.

REFLECTOR SURFACE. To reflect both heat and light.

DECORATION. "Electro-Sheet" is easily bonded to plywood, paper, cardboard, plastics for decorative effects in products, displays, advertising. It takes printing or silk screening.

PRINTED CIRCUITS. Rigidly controlled quality "Electro-Sheet" for the exacting use of fabricating electric circuit wiring by the printing-etching method and by die stamping.

FURNACE BRAZING. For bonding of various metals together by furnace brazing in a reducing atmosphere.

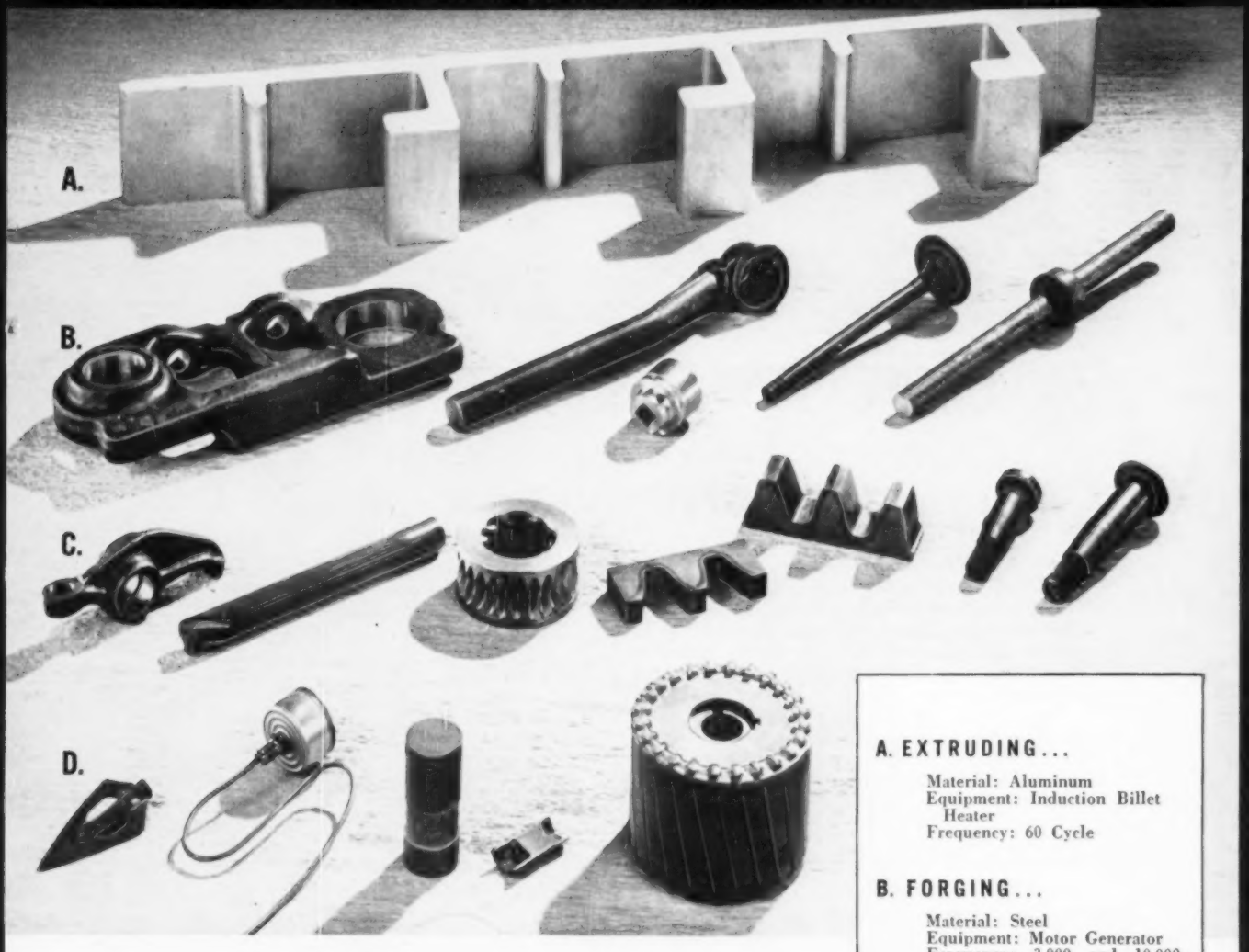
"Electro-Sheet" Copper Foil was developed by Anaconda to provide the positive and durable protection of copper at low cost. It is nonrusting, vermin-proof, nonflammable and impervious to penetration by water, air, or moisture. For detailed information or help in application to your products write: The Ansonia Division, The American Brass Company, Ansonia, Conn. 8702

ANACONDA®

"ELECTRO-SHEET" COPPER FOIL

SOLD BY THE AMERICAN BRASS COMPANY

METAL TREATING WITH MAGNETHERMIC INDUCTION HEATING



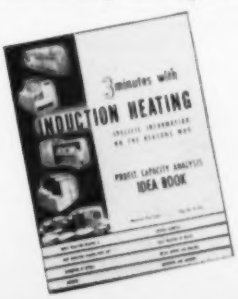
ten years ago . . .

INDUCTION HEATING never entered this picture

Parts like these were heated by costly, conventional methods. The amazing potentials of induction heating had not yet been realized.

Today, MAGNETHERMIC induction heat processes such parts in seconds, with complete production-line automation. Cost-conscious production men everywhere call on MAGNETHERMIC for important cost reductions in all types of metal treating . . . surface hardening, tempering, annealing, stress relieving, and billet heating, to name a few.

Tomorrow, new products, many unheard of today, will require still newer heating techniques. MAGNETHERMIC engineers, creative leaders in the field, are ready with the newest concepts in induction heating to help you reach new production horizons.



This "A-B-C's of Induction Heating" booklet will be most helpful. Write today for your free copy. Send a part or detail prints for authoritative analysis.

A. EXTRUDING...

Material: Aluminum
Equipment: Induction Billet Heater
Frequency: 60 Cycle

B. FORGING...

Material: Steel
Equipment: Motor Generator
Frequency: 3,000 and 10,000 Cycles per Second

C. HARDENING...

Selective and Surface

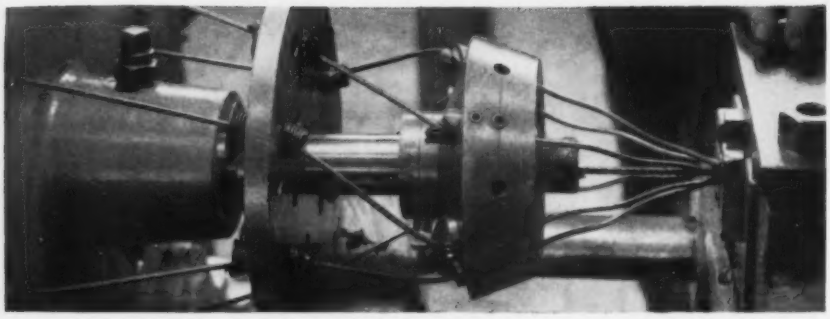
Material: Steel
Equipment: Motor Generator, Electronic Induction Heater
Frequency: 10,000 Cycles per Second; 450,000 Cycles per Second

D. BRAZING...

Material: Copper, Brass, Steel
Equipment: Motor Generator, Electronic Induction Heater
Frequency: 10,000 Cycles per Second; 450,000 Cycles per Second

MAGNETHERMIC®
CORPORATION
3990 SIMON RD. • YOUNGSTOWN 7, OHIO

Engineering Idea Leadership in Induction Heating
60 to 450,000 Cycles



Close-up view of preforming Lang Lay rope by the quill head method in Upson-Walton's Cleveland plant. Stranded wires are threaded through a guide-plate to the quills for preforming of strands prior to entering the closing dies.

YOUNGSTOWN "YOLECTRO" ROPE WIRE

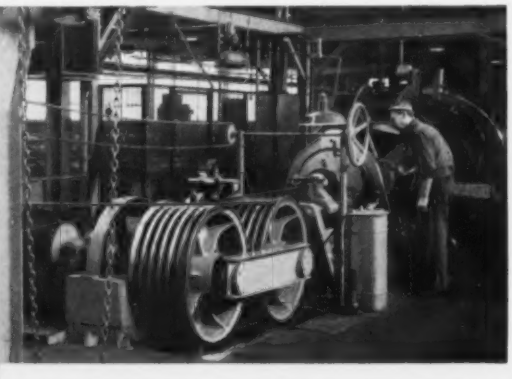
. . . builds strength and safety into **UPSON-WALTON** *wire rope*

Strength and safety are qualities characteristic of Upson-Walton's complete line of wire rope and rope fittings. For nearly 86 years this progressive Cleveland manufacturer has kept their product quality at the highest possible level.

Playing an important part in the Upson-Walton story is Youngstown "Yolectro" High Carbon Rope Wire. It's the basic material used to fabricate their various grades of wire rope. "Yolectro" Rope Wire's high degree of strength, toughness, abrasion resistance, gage uniformity and proper flexibility all contribute to the quality associated with Upson-Walton products.

"Yolectro" Rope Wire is closely quality-controlled throughout all its production operations from iron ore mining to final drawing and coating. This guarantees the desired balance of properties to meet your most exacting requirements. Why not make "Yolectro" your permanent specification for quality production? It's available with either a Bright or Galvanized finish in all AISI high carbon grades.

Metallurgical assistance or additional information is available from your nearest Youngstown District Sales Office. Why not write or phone them today?



Upson-Walton's 32" closer is capable of closing wire rope up to 1¾" in diameter of six-strand construction. Bobbins of stranded wire are loaded into the cradles of the machine and guided to the preforming head and closing dies where it is closed into finished wire rope. Finished wire rope consists of stranded wire from 7 to 41 wires per strand closed around a fibre or steel core, depending upon customer requirements and applications.

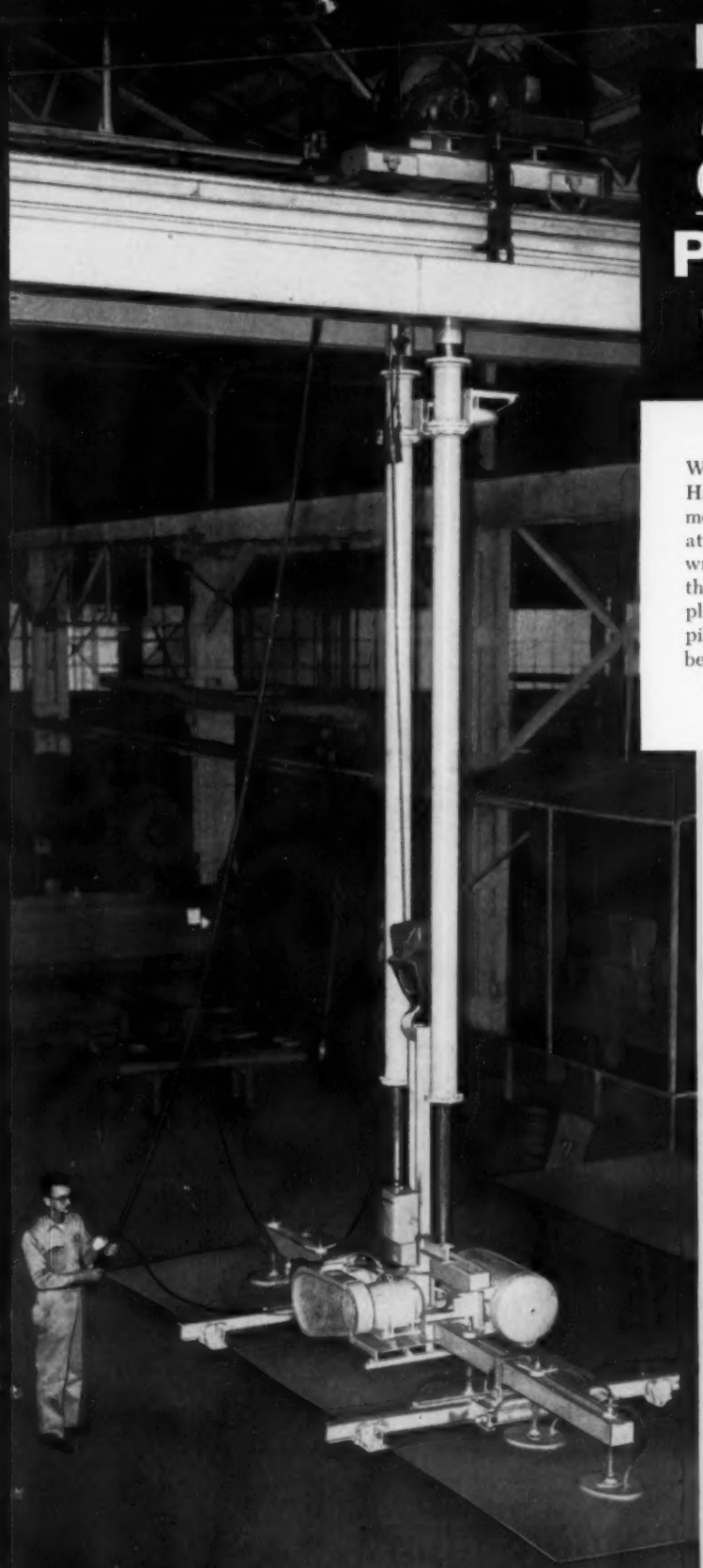
QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio

District Sales Offices in Principal Cities



NOW –

One-Man Plate Handling

WITH YOUR OWN CRANE!

With a NOBLE Pushbutton Plate Handler on your crane, there's no more need for prying up plate to attach slings or grabs... no more wrestling a swaying load through the shop... no more manhandling plate into place on feed tables or piles. One man does the job faster, better, with greater safety.

Here's why:

1. *Automatic* PICK-UP... *NOBLE vacuum lift system picks up sheet or plate on contact with surface; no blocking needed.*

2. *Automatic* MECHANICAL GRABS... *grip plate as soon as lifting begins, provide positive mechanical grip for safe carrying even if power fails.*

3. NO SWING & SWAY... *"stiff leg" crane attachment keeps load under control. One man can guide it safely through shop, spot it accurately on machine feed table or pile – faster!*

NOBLE Pushbutton Handlers are easily installed on cab or floor-operated overhead cranes. Permanent mounting saddle on crane trolley permits attachment or removal of entire handler assembly in 3 minutes, so there's no interference with normal crane use.

Standard lift capacities are 1000, 2000, 3000 and 4000 lbs., larger capacities available on order. Vacuum lift system will handle any type of ferrous or non-ferrous metals or plastics, won't mar finishes or coatings.

Every working hour, every working day, "muscle power" handling methods are eating up profits, slowing production. Want proof? – Check your own shop *now*. Then get the facts on NOBLE Pushbutton handlers – write or wire for complete data. Please address Dept. I-2.

NOBLE also manufactures complete automatic plate handling systems; brochure on request.

6

NOBLE COMPANY

P. O. BOX 1979 • OAKLAND 4, CALIFORNIA

U. S. and Foreign Patents Pending

Parts made by almost every industry have holes made by a KINGSBURY

From the carburetor body to the lock cylinder . . . the bearing race to the hammer head . . . would just be a variety of parts — except for one important advantage in common:

the drilling and tapping operations were completed faster, at lower cost per operation, with unvarying accuracy — in every single part — because an automatic Kingsbury machine did them.

This can mean a distinct manufacturing advantage to *you*, if you have high production drilling, tapping, reaming, spot facing, light milling and similar operations to do on your parts. You can do them at the *rates you need*, at the *lowest practical cost, month in and month out*, on a Kingsbury indexing automatic.

"Kingsbury jobs" — as the automotive and appliance industries frequently call them — are typically done in this manner: The manufacturer sends Kingsbury a print (or sample) of his part, specifying operations and the production rate required. Kingsbury then incorporates the appropriate standard operating units, base, indexing unit and drive, to build an automatic drilling and tapping machine *to do what the customer wants, at the rate he wants.* Test runs by Kingsbury *before* shipment, and *delivery of a fully tooled machine* ready to produce, provide positive assurance that performance will match production requirements.

Whether you make automotive, plumbing, hardware, machine, electrical appliance or some other kind of parts, investigate the production and cost benefits in doing the drilling and tapping on a Kingsbury. Send your requirements and questions to Kingsbury Machine Tool Corporation, Keene, N. H.

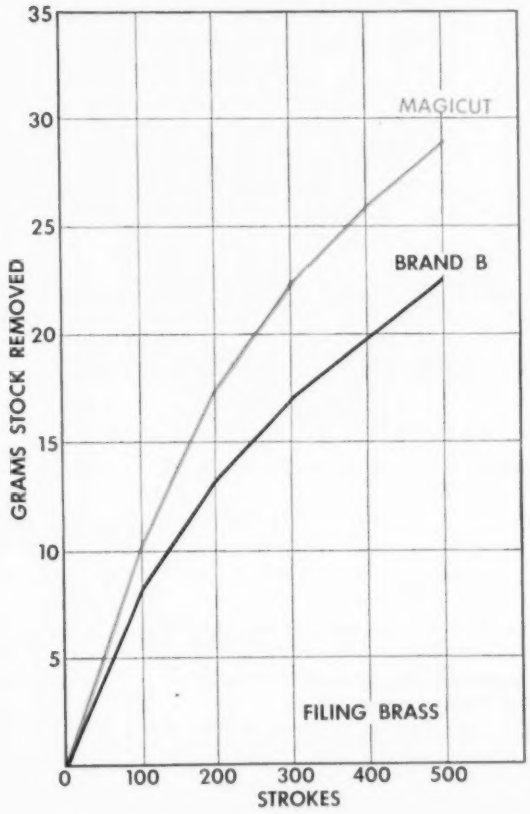
KINGSBURY

INDEXING AUTOMATICS
for high production drilling and tapping

Laboratory report:

New "Magicut" file outperforms other types by wide margins on varied industrial metals

Only way to prove what the new Nicholson or Black Diamond "Magicut" All-purpose Machinist's file will do for you is to try it in your plant.



But we've conducted some laboratory tests. Results of these will give you an idea of the savings you can expect with this unique new file. We compared "Magicut" with all kinds of Machinist's files—old and new, ours and others. (Of course these were *hand* tests.)

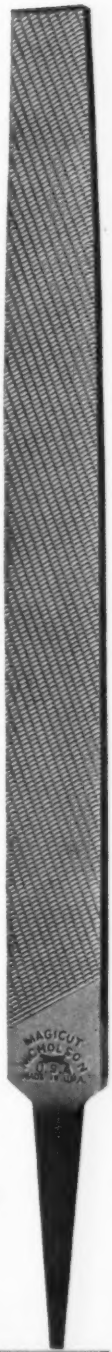
In just one part of these trials—comparing our new file with another described as being similar in purpose—we found these percentage superiorities for "Magicut": 28.8% over Brand "B" on brass (shown in chart) . . . 24.7% on aluminum . . . 16.2% on magnesium . . . 15.4% on .70 carbon steel . . . and 11.4% on copper. *And these figures have been confirmed in the field.*

There's not another file that can cut your metal filing costs like the Nicholson or Black Diamond "Magicut" can. Because not another file has the "Magicut's" Penetrating Planer-type Teeth. These rough and smooth industrial metals in a single stroke. You need fewer files —fewer strokes per job.

"Magicut" is the cost-cuttingest file you can use. Available right now in Flat, Half Round and Square shapes . . . 8", 10", 12" and 14" lengths. See and try "Magicut" soon.

FREE! Complete reports of "Magicut" laboratory findings. Send for this authoritative guide to lower filing costs.

Industrial Distributors provide the finest goods and services in the least possible time. Our files are sold exclusively through them.



"Magicut's" perfectly formed gullets eliminate "pinning" and consequent scratching. Note steep-angled serrations which produce maximum cutting surfaces.

NICHOLSON FILE COMPANY, PROVIDENCE 1, RHODE ISLAND

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)

NICHOLSON and BLACK DIAMOND FILES

A FILE FOR EVERY PURPOSE

5 BARDONS & OLIVER Automatic Cutting-off Lathes replace 11 machines at CRANE Co.

The results at Crane Co., leading producer of valves and fittings:

- **5 machines cutting-off and chamfering the entire production of pipe nipples**
- **More production with less than half as many machines**
- **Additional floor space made available for other production facilities**
- **Performance of all 5 machines entirely satisfactory**

The Crane Co. story is normal rather than unusual. In all segments of industry where pipe, tubing, and bar stock are cut-off, the reports are much the same.

Adaptable to any situation, the cutting-off lathes may be:

- **Automatic, semi-automatic or hand operated**
- **Air or hydraulically controlled, or a combination of the two**
- **Equipped with chamfering and forming attachments**
- **Supplied with automatic loading tables and transfer equipment**

Whatever your cut-off problem is, Bardons & Oliver, Inc. has a machine to do the job. Write today for more information and production estimates on your work.

Manufacturers of a complete line of Turret Lathes and Cutting-off Lathes

BARDONS & OLIVER, INC.

1136 WEST 9TH STREET • CLEVELAND 13, OHIO

Cracked shaft in Valdosta... **His job: get a new one down to Georgia by tomorrow noon.** It's an emergency case, but it's not as tough as it sounds.

He's backed by the press industry's largest parts department . . . by a million dollar parts inventory in two plants . . . by telephone and Teletype tie-ups between Parts Headquarters in Hastings, Michigan and Toledo and local sales and service centers throughout the country.

Which is another reason why we say, "Bliss is more than a name . . . it's a guarantee."

BLISS
SINCE 1857

E. W. BLISS COMPANY · Canton, Ohio

100 years of making metal work for mankind

PRESSES • ROLLING MILLS • MILL ROLLS • DIE SETS • CAN MACHINERY • ORDNANCE

Operating records show unmatched benefits!

H-W C-MIX used for contour-rammed open hearth and electric steel furnace bottoms greatly reduces furnace down-time, saves labor and avoids burning-in sacrifice of refractory superstructure. And with its measurable margin of superior properties, costs are decidedly lower and furnace availability is greatly increased.

- **HIGH MAGNESIA CONTENT**—Made from high purity seawater periclase with the magnesia content over 92%, H-W C-MIX best withstands the corrosive action of highly basic slags.
- **STABLE**—It is fully converted to periclase and has excellent volume stability with negligible shrinkage at highest operating temperatures.
- **HYDRATION RESISTANT**—H-W C-MIX is unique in its high degree of resistance to hydration.
- **STRONG**—High strength over the entire range of steel furnace temperatures accounts for its unusual resistance to erosion.
- **DENSE**—High density and low permeability retard penetration by molten metal and corrosive slags.
- **ECONOMICAL**—H-W C-MIX provides the most durable monolithic hearths with low installation cost.

World's Largest Producer of Refractories

HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES
General Offices: Pittsburgh 22, Pennsylvania

NEW THEW-LORAIN

"Square Tubular-Chord" Crane Boom

The Moto-crane, designed and built by The Thew Shovel Company of Lorain, Ohio, offers a uniquely light, powerful, maneuverable boom. Completely fabricated of Shelby Seamless Mechanical Tubing, the boom consists of four main chords of square tubular construction, reinforced by lacing of round tubing. In sizes, the main chords range from 2″ x 2″ x .189″ wall to 4″ x 4″ x .250″ wall.

The advantages of this type of construction are manifold. The square cross section of the four main chord members gives the greatest radius of gyration for column strength, 15% better than round members, 90% better than angles. This radius is the factor that gives square chord sections the greatest column strength per lineal foot of weight. The result is a weight savings of 20 to 30%, greater strength, and increased lifting capacity. It also permits handling and traveling with longer booms.

Why Shelby Seamless Mechanical Tubing was chosen...

Primarily, it offers the ultimate in strength and rigidity in proportion to its size and weight. Secondly, it is shock-absorbent, uniform throughout, dimensionally accurate, and possesses excellent machining and superior welding properties. It is produced under rigid standards, and is available in a generous range of diameters, wall thicknesses, various shapes and steel analyses.

Contact our engineers. Let them help you to adapt Shelby Seamless Mechanical Tubing to your specifications.

The 35TM Moto-crane unit with straight 105-foot boom and a 20-foot tip extension. Some of these booms have been as long as 200 feet.

National Tube Division, United States Steel Corporation, Pittsburgh, Pa.
(Tubing Specialties)
Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Supply Division, Warehouse Distributors
United States Steel Export Company, New York

SHELBY SEAMLESS MECHANICAL TUBING

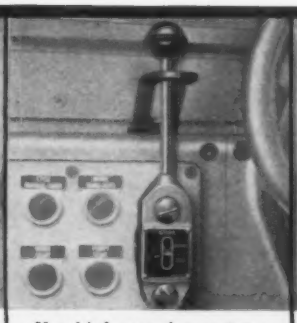
A Product of National Tube

WALLS WITHOUT WELDS

UNITED STATES STEEL

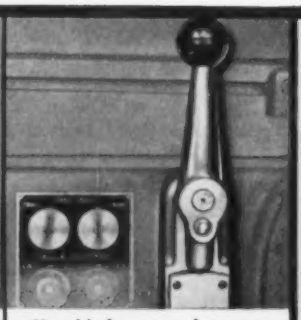
Profits in easy reach...

Flip this switch to set work rotation and coolant flow for manual operation or automatic operation with the cycle.

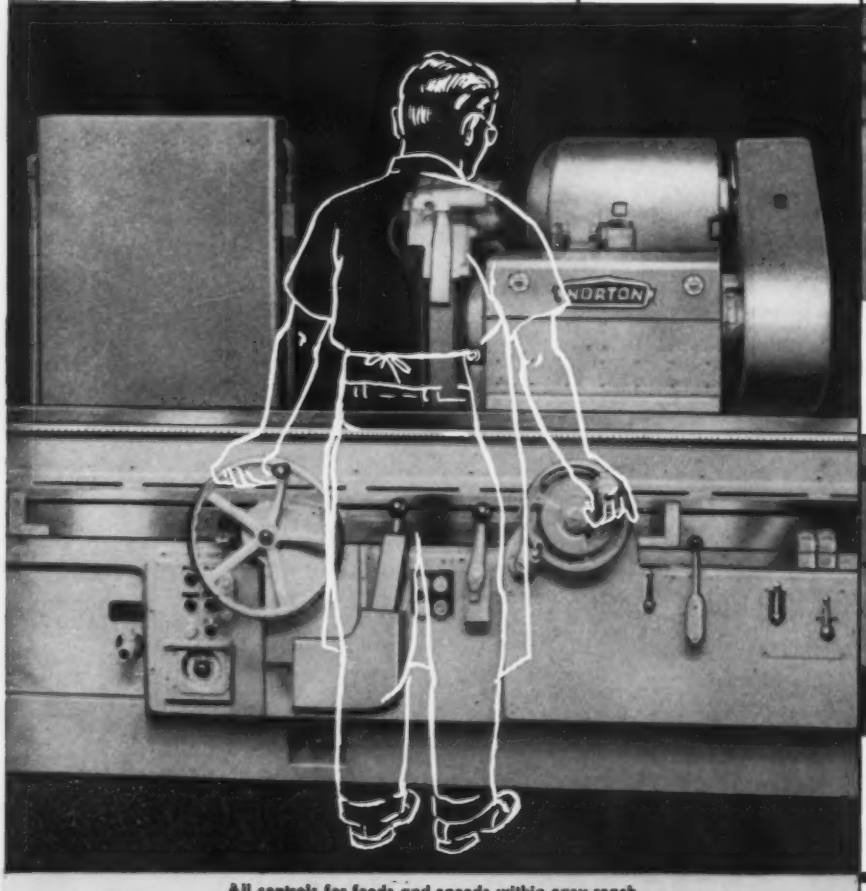


Use this lever to jog work rotation for roundness inspection or unloading.

Turn these knobs to set separate dwell controls for each end of table travel.



Use this lever to select preset table-truing or grinding speed — eliminating need for continual re-settings.



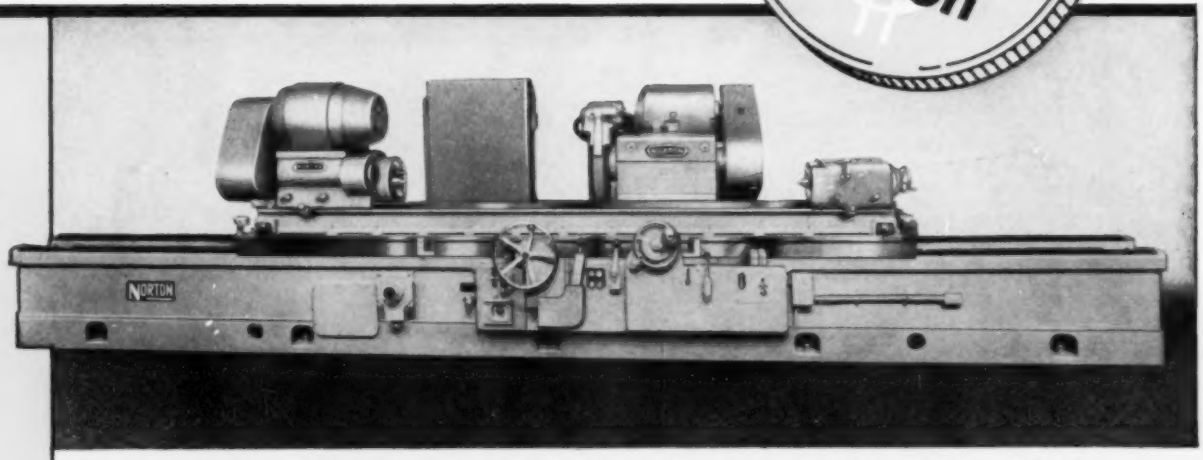
All controls for feeds and speeds within easy reach.

Count the indexing clicks on this wheel-feed handwheel for work diameter reduction in increments as fine as .0001".

Use this simple control for adjusting automatic feed from zero to .003". Total automatic feed is .150" on diameter, with automatic reset after grinding to size.

with two new advanced design Norton Cylindrical Grinders

Cut waste motion



The Norton 14" x 96" Type C-2 Semiautomatic Cylindrical Grinder — one of two sizes of new cylindrical grinders just announced by Norton.

The other is the 18" Type LC-2. Work length capacities of 36", 48", 72", 96", 120", 144" and 168" are available.

Feed and Speed Adjustments all on front of 14" Type C-2 and 18" Type LC-2 Grinders . . . Key Maintenance Points Easily Accessible

Features on these two new Norton cylindrical grinders mean more profit because they eliminate waste motion.

Operators of the 14" Type C-2 and 18" Type LC-2 need never leave their normal positions to make changes in settings. Controls are all at their fingertips.

All equipment needing occasional inspection is in easy reach. Electrical controls are grouped in an elevated enclosure. Motors, pumps, filters, pressure relief valves, and ways lubricant valves are all mounted on the outside for inspection or service.

The machines incorporate the proved Norton wheel spindle design, positively controlled micrometer-fine wheel feed design and generous, rugged overall construction to insure highest productive capacity and unsurpassed sizing control. They assure lowest costs in producing highest quality parts.

These features and many more give you the "Touch of Gold", by making your grinding more profitable. And only Norton can bring you the long experience with both grinding machines and wheels that is engineered into these advanced machines.

Ask Your Norton Representative

for more facts about the new 14" Type C-2 and the 18" Type LC-2 cylindrical grinders. Or write direct to NORTON COMPANY, Machine Division, Worcester 6, Mass. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.

***To Economize, Modernize with* NEW**

NORTON

GRINDERS and LAPPERS

Making better products . . . to make your products better

Norton Products: Abrasives • Grinding Wheels • Grinding Machines • Refractories
Behr-Manning Products: Coated Abrasives • Sharpening Stones • Behr-cat Tapes

District Offices:
Worcester • Hartford • Cleveland • Chicago • Detroit

Here's the way to MODERNIZE your Forge Shop

Economically · Quickly

Put CECO-DROP upperworks on your board drop anvils—

For quick modernization at a minimum cost, investigate the possibility of fitting Ceco-Drop upperworks to your present board drop anvils and foundations.

You can have the benefit of all the advantages and exclusive features of the Ceco-Drop without being involved in the time and expense of replacing the anvil or disturbing the foundation.

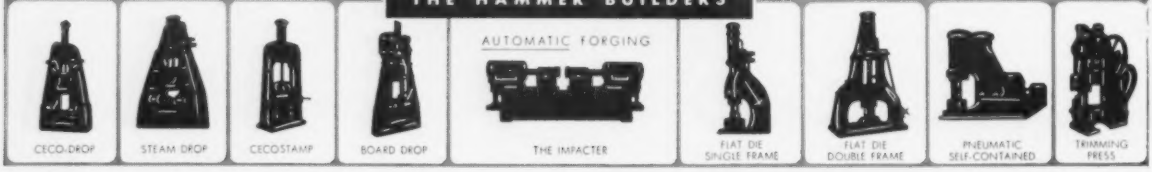
With the Ceco-Drop upperworks, you'll have improved production rates, economies in operation and operator satisfaction that will well repay the investment.

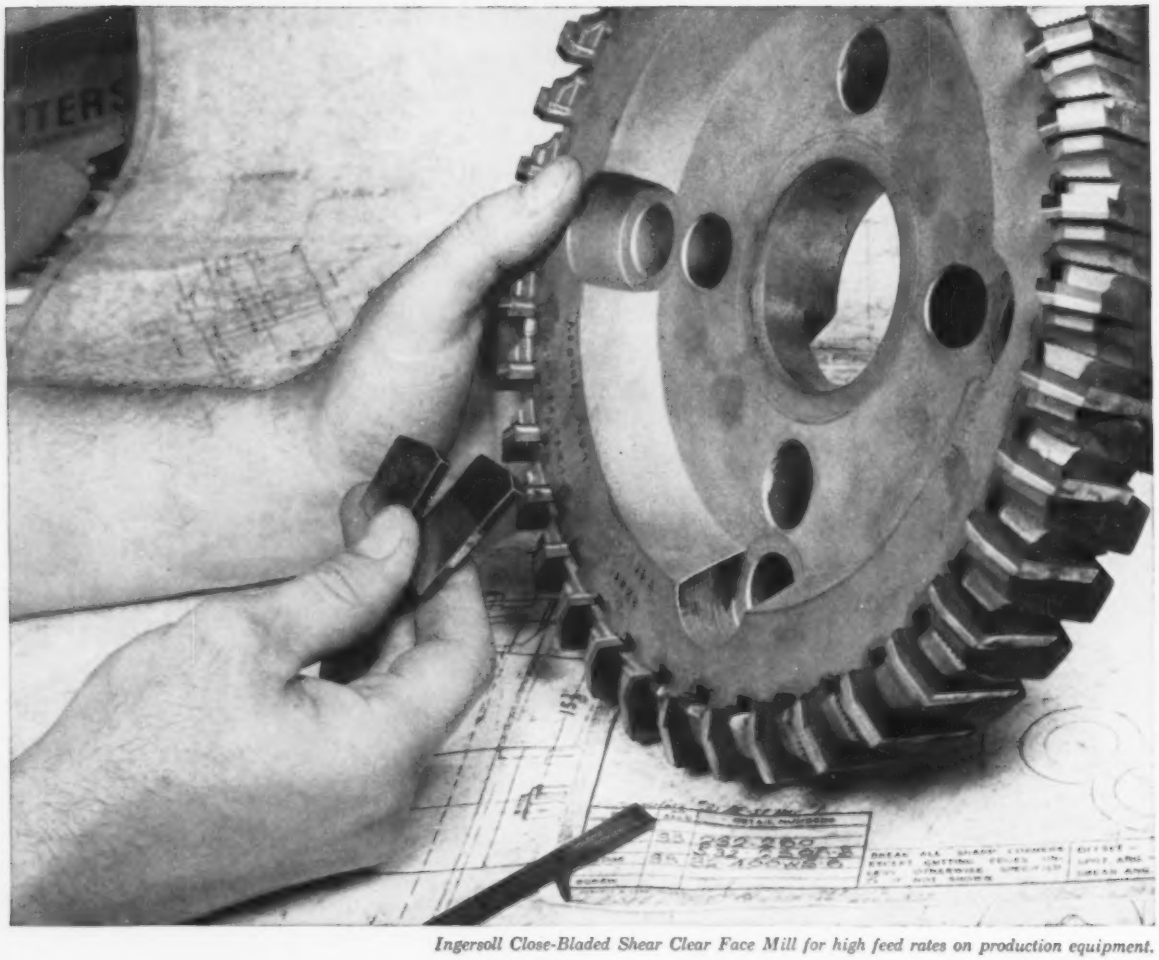
Write or phone us.

CHAMBERSBURG ENGINEERING COMPANY . . . . . CHAMBERSBURG, PA.

CHAMBERSBURG

THE HAMMER BUILDERS





Ingersoll Close-Bladed Shear Clear Face Mill for high feed rates on production equipment.

Is This Good Blade Life?

The answer is "yes" only if a maximum number of parts were produced. If the blades were badly chipped and only used a few times, it was a costly operation.

This is only one of the factors which determine tool costs in your shop.

To develop the lowest milling costs requires a complete study of feed rates, cutting speeds, finish requirements, depth of stock and when to change cutters. It's part of our service to work with you in considering these and other factors before recommending any cutter.

We will welcome an opportunity to tell you more about this service. Write:

If you do not have a copy of this book, write us and we will send you one. It describes in detail the complete line of Ingersoll inserted blade milling and boring tools. Ask for Catalog #66N

CUTTER DIVISION

THE INGERSOLL MILLING MACHINE COMPANY

505 FULTON AVENUE — ROCKFORD, ILLINOIS

BETTER LUBRICATION BEGINS WITH ALEMITE **OIL-MIST**

How to cut lubricant costs up to 90% — and increase production!

Large and small plants  in many industries are making important maintenance savings  while actually boosting machine output—with Alemite Oil-Mist  Automatic Lubrication.

The Oil-Mist system atomizes oil into air-borne particles,  carries them through tubing to all lubrication points  and bathes every moving surface with a cool film of clean lubricant  while machines operate. It provides constant, uniform, completely automatic  lubrication to a few or to hundreds of bearings.  Accurate and foolproof, Oil-Mist eliminates guesswork.  No bearing can be overlooked  or over-lubricated.

Three types of Oil-Mist fittings apply lubricant in the form required. Either a mist fitting  or a condensing fitting  or a spray fitting,  is used to lubricate any lubrication point.

An Oil-Mist system  can be applied to any new or installed machine.  Find out in detail how it cuts costs,  reduces man-hours and machine downtime, extends bearing life, and increases production.

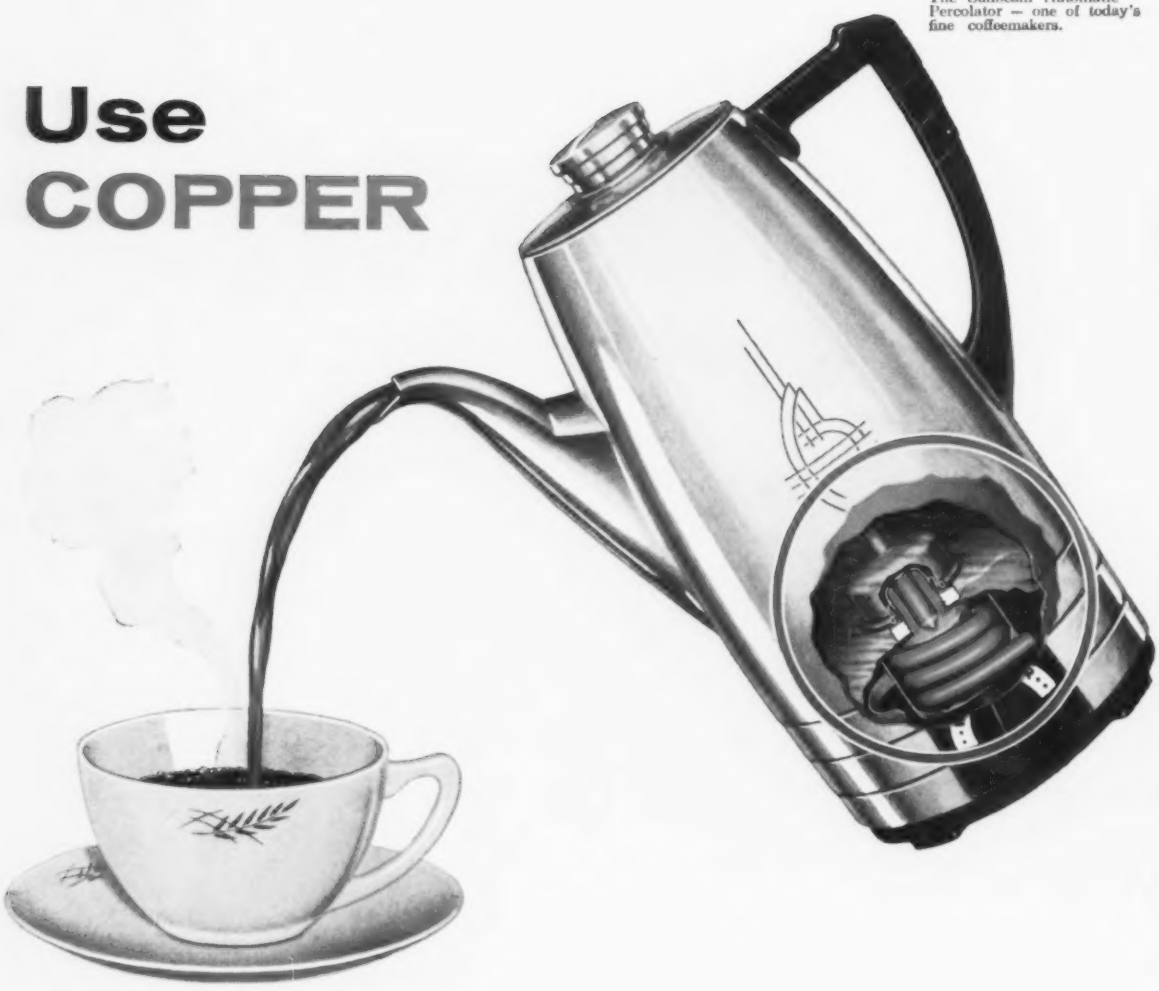
Write  Alemite, Dept. G-28, 1850 Diversey Parkway, Chicago 14, Illinois.

Makers of these automatic centralized lubrication systems: Oil Mist · Accumatic · Accumite

1850 Diversey Parkway, Chicago 14, Illinois

ALEMITE DIVISION
STEWART-WARNER CORPORATION
Symbol of SW Excellence

Use COPPER



The Sunbeam Automatic Percolator — one of today's fine coffeemakers.

...and your percolator is three ways better

Copper played a big part in making that eye-opening cup of coffee you had this morning. In fact, three of Copper's outstanding advantages are being used in today's superb automatic coffeemakers.

First, Copper's excellent combination of thermal conductivity and corrosion resistance makes it an ideal container for the brew — and the electric heating element. Second, because of Copper's high ductility, it can be shaped in fewer operations, with lower tooling and time costs. Third, Copper adds to the durability and beauty of these appliances, too, taking a brilliant chromium plating easily . . . with nothing underneath that can rust. Or, if Copper's own warm, handsome color is desired, it can be buffed to a mirror polish.

Combined, these three forms of usefulness are unmatched by any substitute for Copper.

If you're a manufacturer, you will find exceptional workability in Copper and its alloys. They are easier to machine, form, draw, stamp, polish and plate. Count on Copper in your future — the industry's reserves are now at a record high, productive capacity is stronger than ever!

COPPER · BRASS · BRONZE

in over 40 Standard Alloys!

For information on the above or any other application of Copper, write to the Copper & Brass Research Association, 420 Lexington Ave., New York 17, N. Y.

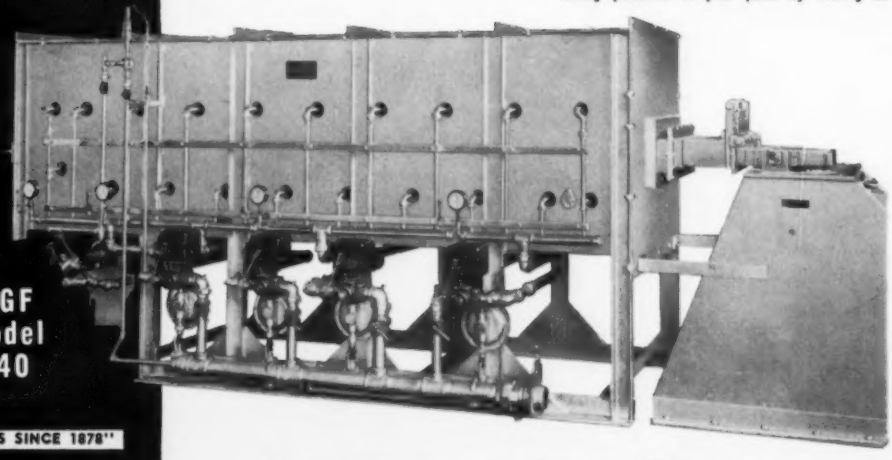
AGF Automatic Heat Treating lowers your production costs - - increases work quality.

AMERICAN GAS FURNACE CO. 80 YEARS OF PIONEERING 1878 1958 ELIZABETH, N. J.

Full atmosphere control and the unique "shaker hearth" action provides full range versatility. The same furnace can handle work ranging from pen points up to large and heavy forgings. Clean hardening, case hardening, carburizing can be employed without any modification.

CONTINUOUS WORK FLOW RECIPROCATING FURNACES minimize costly work handling. These versatile furnaces with completely automatic feeding and continuous flow conveyorized quenching can be operated as an automatic heat treating installation or can be incorporated into your plant production line.

There are standard AGF Reciprocating Furnaces to meet your heat treating requirements. Investigate their cost saving potential in your plant by writing us today.



AGF Model 240

"PIONEERS SINCE 1878"

AMERICAN GAS FURNACE CO.

1004 LAFAYETTE STREET, ELIZABETH 4, NEW JERSEY

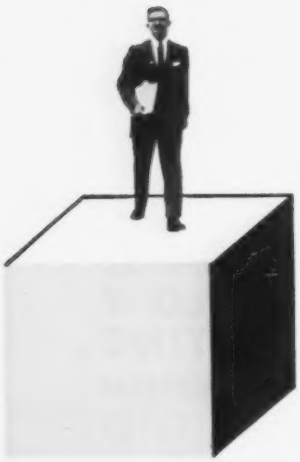
The man from Olin Aluminum stands for a big Service Principle...

He offers you the unique advantage of Aluminum that is custom-tailored, from the start, to your exact requirements.

As salesman, field engineer or technical specialist, he brings to your service a personal reputation for integrity and experience in the Aluminum field. And behind him stands a flexible, compact organization skilled in a special Olin Mathieson Principle of swift, responsible and unwavering attention to every detail of your order.

He is ready to serve you now. Just call any of the offices listed below, or write:

Aluminum Division,
Olin Mathieson Chemical Corporation,
400 Park Avenue, New York 22, N. Y.



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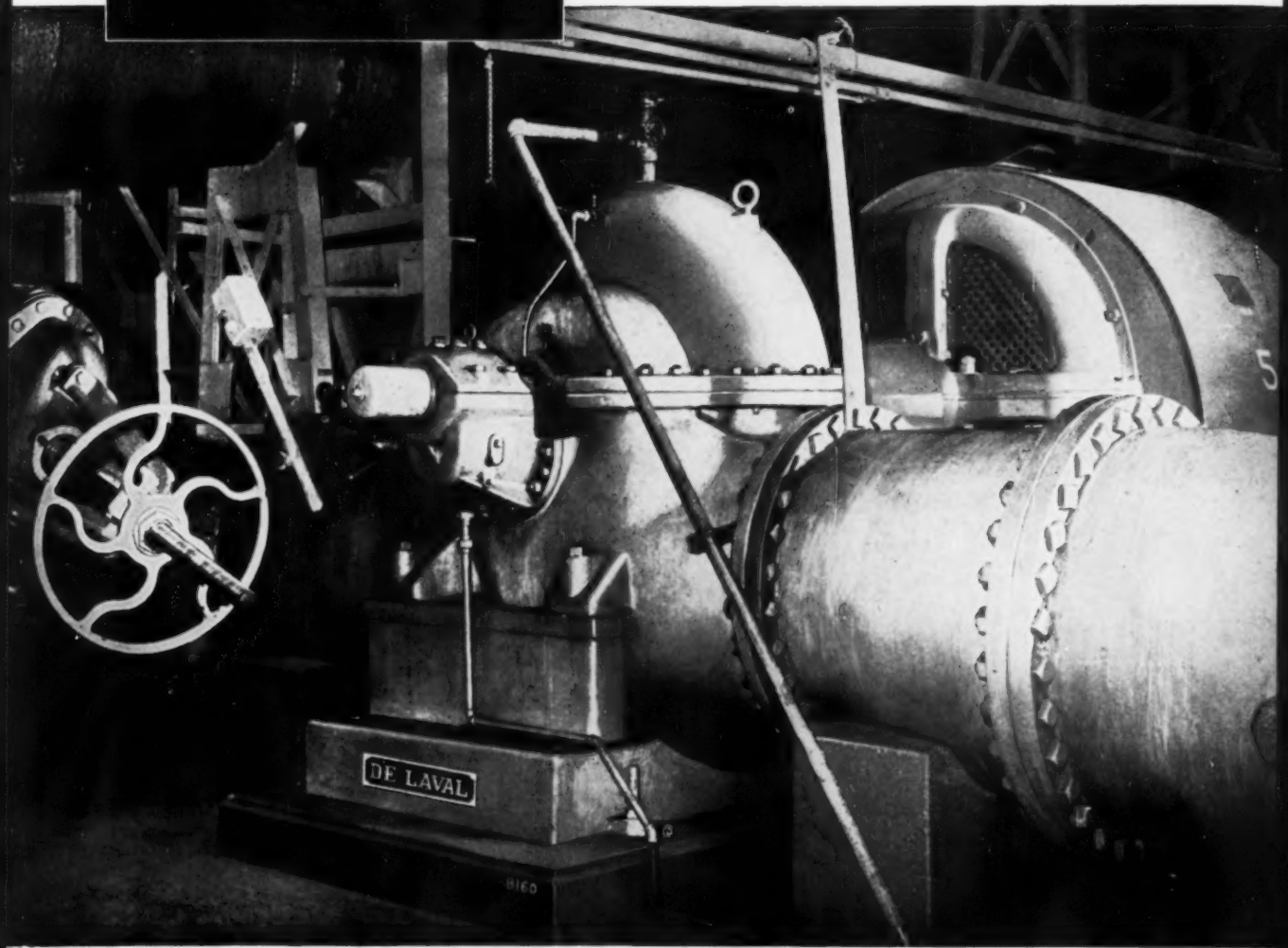
OLIN MATHIESON CHEMICAL CORPORATION
OLIN ALUMINUM

Ω AND "OLIN ALUMINUM" ARE TRADEMARKS

Symbol of Quality and Service in the Aluminum Industry

DE LAVAL
CENTRIFUGAL
PUMPS

in service since 1911 at Inland Steel Co.



De Laval Centrifugal Pumps have a record of dependability at the Inland Steel Co., which goes back forty-five years. In that time, De Laval has supplied this major producer with pumps for practically every steel mill service—*more than 75 units in all.* The photograph shows one of the largest De Laval pumps on the line at the East Chicago, Indiana plant of Inland Steel. The unit delivers 20,000 gpm at 120 ft head.

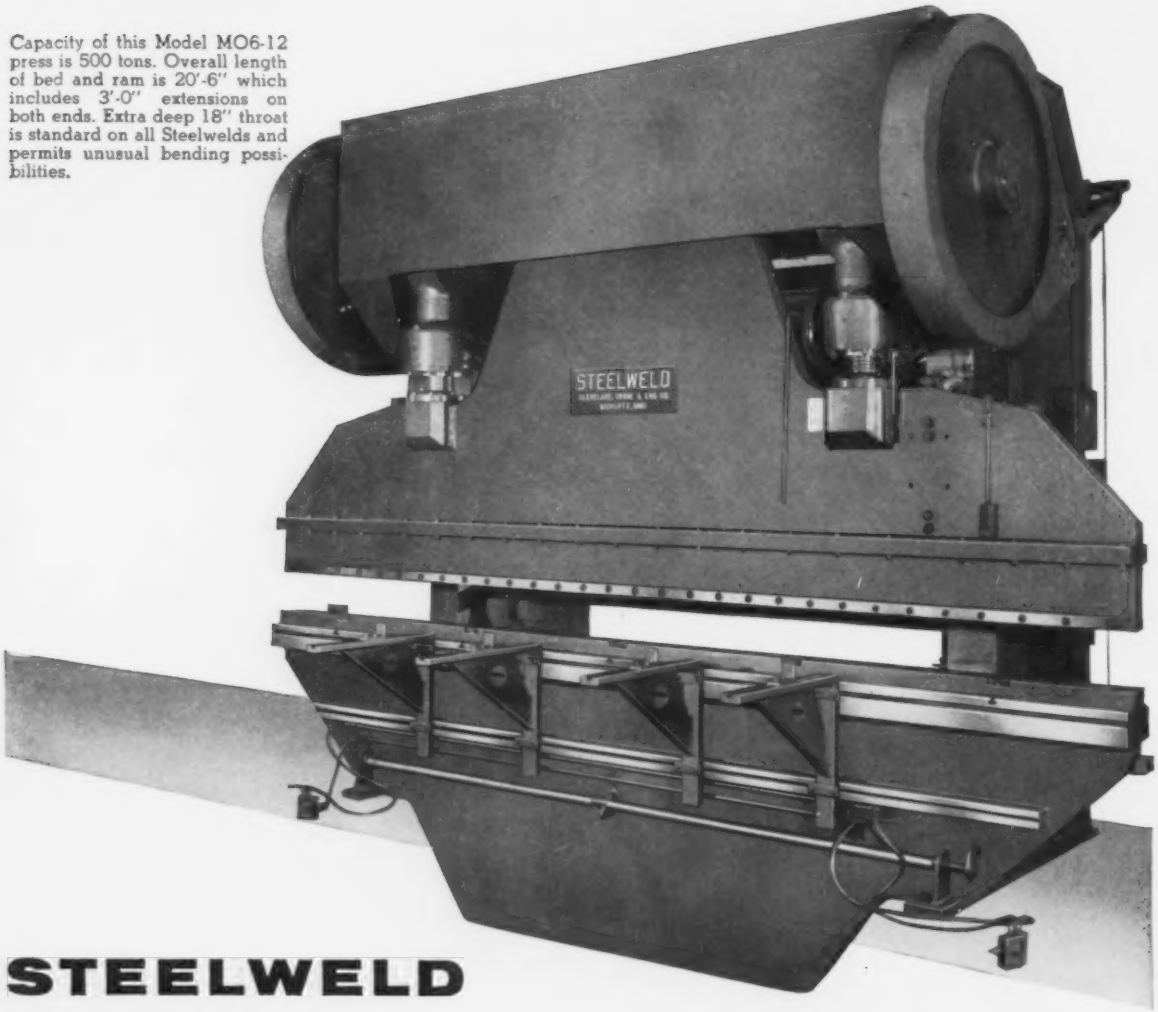
De Laval Centrifugal Pumps are available for a wide range of applications in all types of metal-working plants. Types L, M and P single stage double suction pumps can handle capacities from 1,000 to 20,000 gpm and heads to 350 feet. Larger De Laval units of any capacity to meet any requirement for steel mill service are available.

Send for Bulletin 1004 giving performance and application data.

DE LAVAL *Centrifugal Pumps*

DE LAVAL STEAM TURBINE COMPANY
899 Nottingham Way, Trenton 2, New Jersey

Capacity of this Model MO6-12 press is 500 tons. Overall length of bed and ram is 20'-6" which includes 3'-0" extensions on both ends. Extra deep 18" throat is standard on all Steelwelds and permits unusual bending possibilities.



STEELWELD

PRESS BRAKE Designed For Special Gooseneck Punch and Standard Dies

THIS Steelweld Brake was designed to take a special gooseneck punch and, for this reason, has a shut height of 30 inches. However, it will also accommodate standard dies because the ram is provided with an extension, as shown, which brings the shut height down to 16 inches.

The bed has a slide rail on which is mounted four brackets, adjustable up and down and along the bed, for supporting materials going through the machine. The brackets have adjustable stops that enable gauging the width of metal being formed.

STEELWELD

PRESS BRAKES

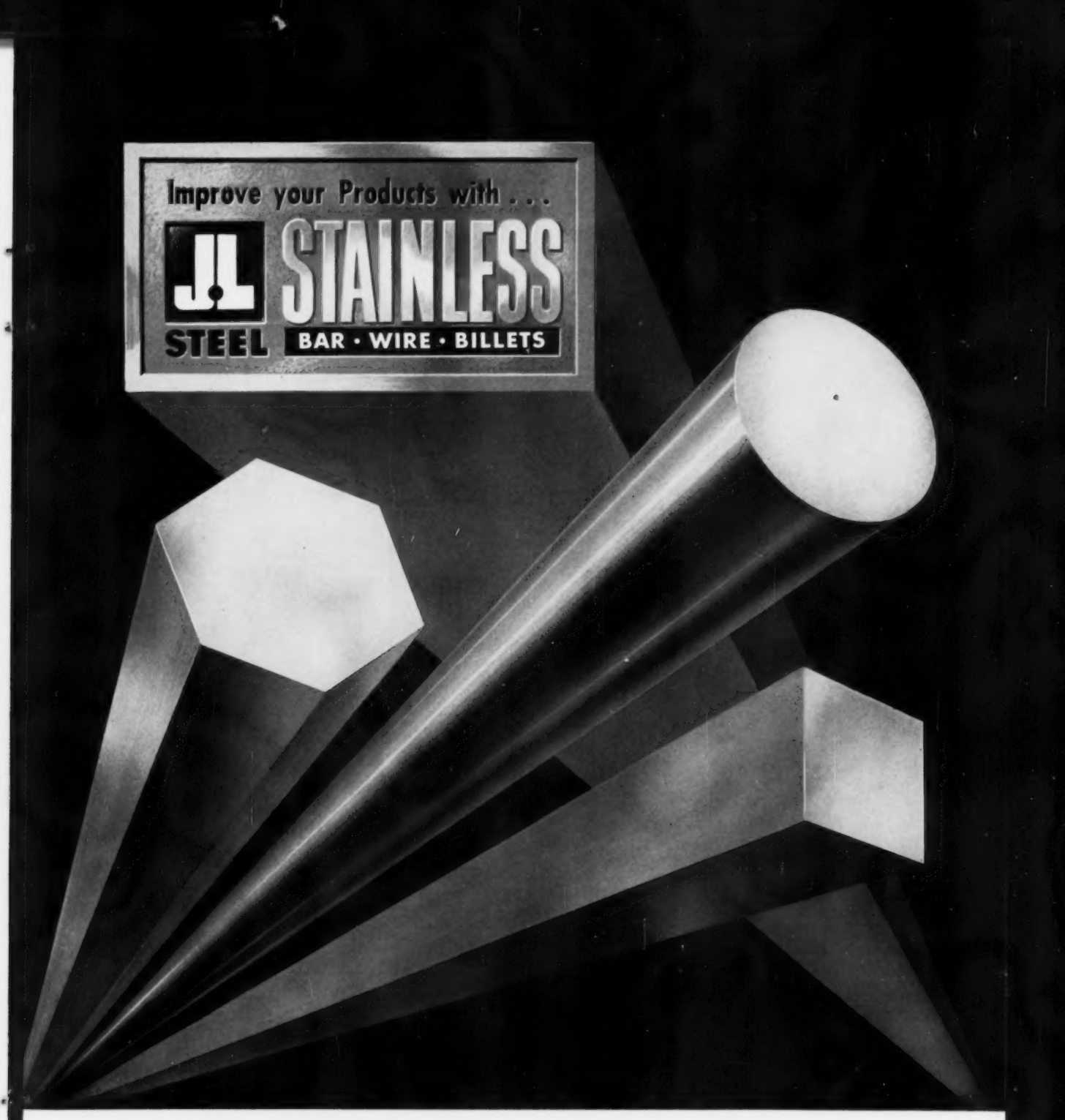
Like all Steelweld Brakes, this press was designed to permit hairline accuracy. Under full load the average deflection will not exceed .001 inch per foot between housings. An important reason for this accuracy is the unusually rigid frame which was fabricated entirely of rolled steel plate and welded into a one-piece integral unit. Another is the extra deep bed which extends 2'-6" below the floor.

The machine has a 6-inch stroke with two speeds of 7 and 20 strokes per minute. The clutch is air-operated and controlled by two foot-operated valves. A reversing flywheel permits reversing the ram at any position of the stroke.

The Steelweld Brake design is readily adaptable to suit special requirements. Our engineers will be glad to work with you on press brake and heavy stamping problems.

Write for free copy of Catalog No. 2010

STEELWELD DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. 4867 E. 281 ST. • WICKLIFFE, OHIO

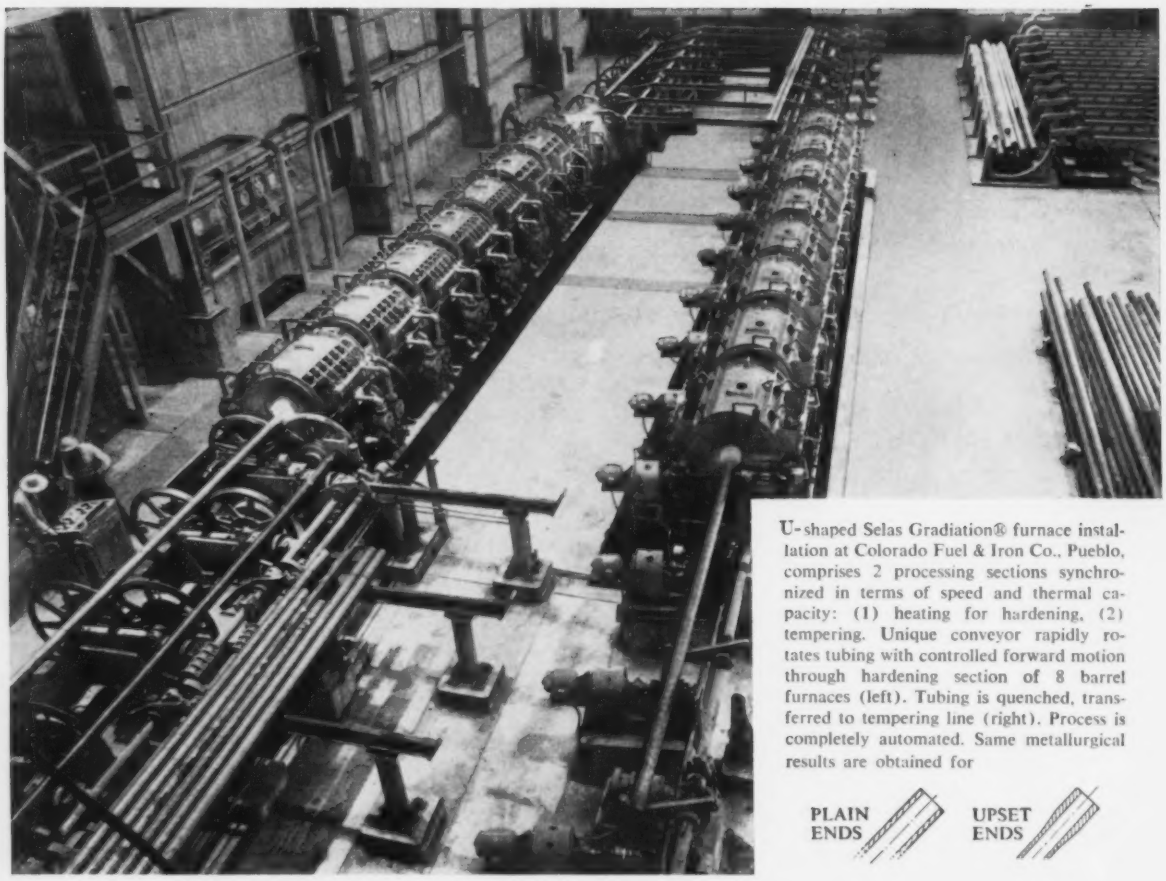


The superior quality of J & L Stainless Steel makes fine products finer. Our inventory of stainless bars in a large range of sizes and grades is available for immediate shipment. Write or call the J & L Stainless Steel Division in Detroit for your copy of the latest stock lists.

Jones & Laughlin
STEEL CORPORATION
STAINLESS STEEL DIVISION
Box 4606 • Detroit 34, Michigan

Improve your Products with . . .
J&L STEEL **STAINLESS**
BAR • WIRE • BILLETS

our research is your reward



U-shaped Selas Gradiation® furnace installation at Colorado Fuel & Iron Co., Pueblo, comprises 2 processing sections synchronized in terms of speed and thermal capacity: (1) heating for hardening, (2) tempering. Unique conveyor rapidly rotates tubing with controlled forward motion through hardening section of 8 barrel furnaces (left). Tubing is quenched, transferred to tempering line (right). Process is completely automated. Same metallurgical results are obtained for

Physical Properties of Deep Well Casing Improved, Uniformity Achieved . . . with Selas Short-cycle Hardening and Tempering

In the heat-treating of carbon and low alloy seamless steel tubing, for a given tensile strength or hardness, Selas short-cycle hardening and tempering develops higher yield strength with no sacrifice in ductility. For with Selas short-cycle heating, a higher tempering temperature can be employed (with no soaking), enabling more complete relief of residual hardening stresses.

Surface carburization is reported to be negligible, scaling is minimized . . . even though no specially-prepared atmosphere is used.

With Selas Gradiation, heating for hardening, quenching and short-cycle tempering of steel tubing are performed continuously, automatically. Consistent metallurgical uniformity is obtained throughout each tube and from tube to tube . . . in both plain and upset ends.

Upsetting, to increase wall thickness for threading, also utilizes Selas short-cycle heating. Compact, slot-type furnace quickly heats and automatically delivers tube-ends to upsetter.

In other mills, Selas barrel furnace lines heat seamless tubing for annealing and sizing as well as hardening-and-tempering; and heat welded pipe for normalizing.

All are continuous, in-line operations. Compact, fast-heating, gas-fired Selas furnaces save valuable floor space, are adaptable to variations in production-line speeds.

Send for informative articles on Selas tube and bar heating installations. Address Dept. 22.

Gradiation is a registered trade name of Selas Corporation of America.

SELAS
CORPORATION OF AMERICA
DRESHER, PENNSYLVANIA

Heat and Fluid Processing Engineers
DEVELOPMENT • DESIGN • CONSTRUCTION

AMBALLOY...A. M. BYERS ELECTRIC FURNACE QUALITY STEEL PRODUCTS

BYLOY W2 ADDS STRENGTH, INCREASES WEAR-RESISTANCE

BYLOY Grade W2 is a high-strength, abrasion-resistant steel, which attains superior physical properties through heat treating.

The combination of manganese, molybdenum, copper and boron—alloyed with steel in proper balance and proportion—results in great strength and high fatigue resistance. This alloy is available now in hot rolled plates and bars which can be heat treated to several hardness ranges.

Automotive, mining, agricultural, earth moving and conveyor equipment are just a few of the end-product applications where BYLOY wears so well. Call in the Byers metallurgist for information on BYLOY, or any of the other electric furnace steels we produce. Write: A. M. Byers Company, Clark Building, Pittsburgh 22, Pennsylvania.

A growth company with the emphasis on quality and service **A. M. BYERS COMPANY**

Carbon and Alloy Steels?

Leave it to FRASSE!

There's a wide selection of carbon and alloy steels to choose from when you work from Frasse stocks! You'll find a complete size range of carbon bars and shafting—as well as commercial and aircraft quality alloys . . . ready for immediate delivery to your plant.

In all, you can pick from 20 different grades—any one of 2001 sizes. Frasse has a size and grade suitable for any application . . . and steel specialists who can assist you with grade selection and methods of fabrication.

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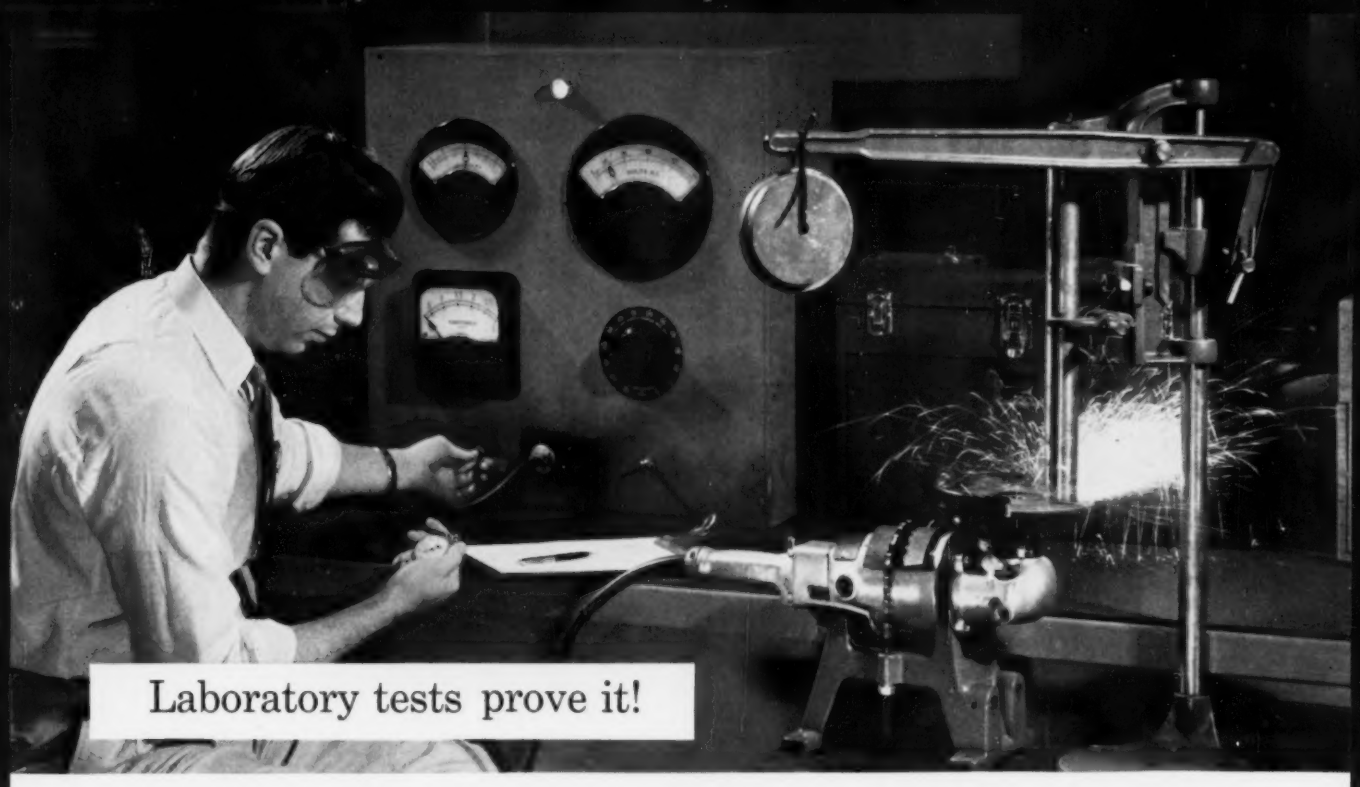

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This and other tests prove Isophthalic refinishing enamels have a wide margin of superiority in hardness, durability and gloss retention over conventional commercial-grade enamels.

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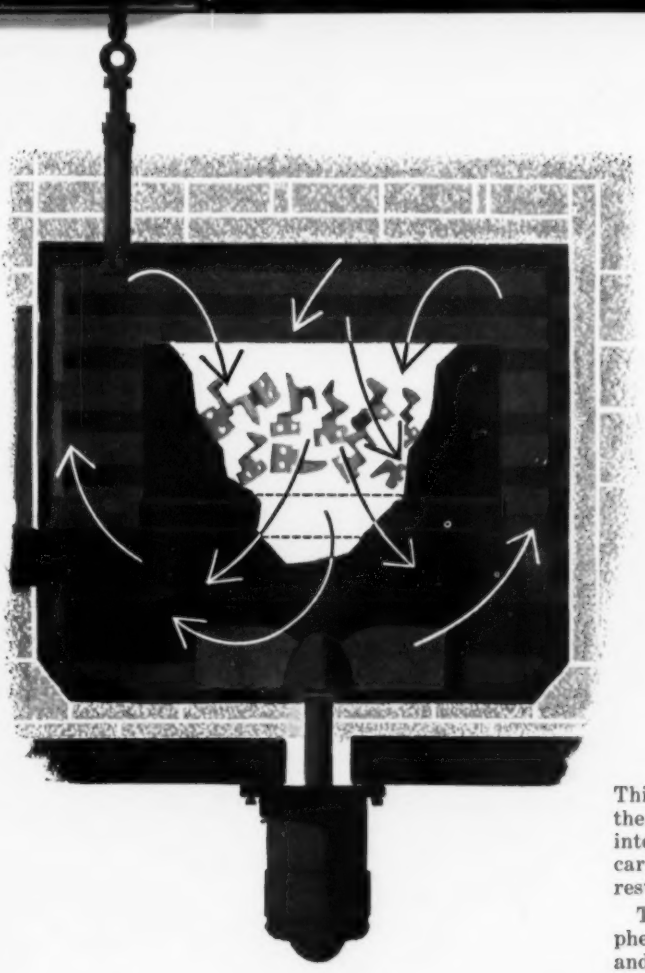

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The L&N Tricarb method with controlled atmosphere . . . temperature . . . quench

This precision furnace is the most versatile in the history of heat treating. It can be used interchangeably for controlled case carburizing, carbonitriding, homogeneous carburizing, carbon restoration, or hardening.

The unique combination of Microcarb atmosphere control, Speedomax® temperature control and the controlled quench, makes possible significant quality improvements in production heat treating. New, efficient, L-O voltage radiant tube heaters are rugged, requiring minimum maintenance—are not subject to failures from carbon deposits when the furnace is used for carbonitriding without Microcarb control.

In many instances the Tricarb method has proved a practical solution to lower production costs . . . higher quality . . . more process automation . . . elimination of rejects and spoilage. In others it makes thoroughly practical the handling of many previously impossible or difficult heat treatments on a reproducible, production basis.

Folder T-620(17) explains the Tricarb Method. Write us at 4956 Stenton Ave., Phila. 44, Pa.

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When small cams for electrical instruments are carburized in this Tricarb furnace, 6¢ per piece is saved on subsequent buffing operations because work comes from the furnace so clean.

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Here's the heavy-duty power stretcher you'd expect from Signode—

- . . . Get any preset tension—3900 lb. at 120 psi., 2100 lb. at 60 psi.
- . . . Tensions Signode steel strapping, dry or waxed, up to 1¼ x .050.
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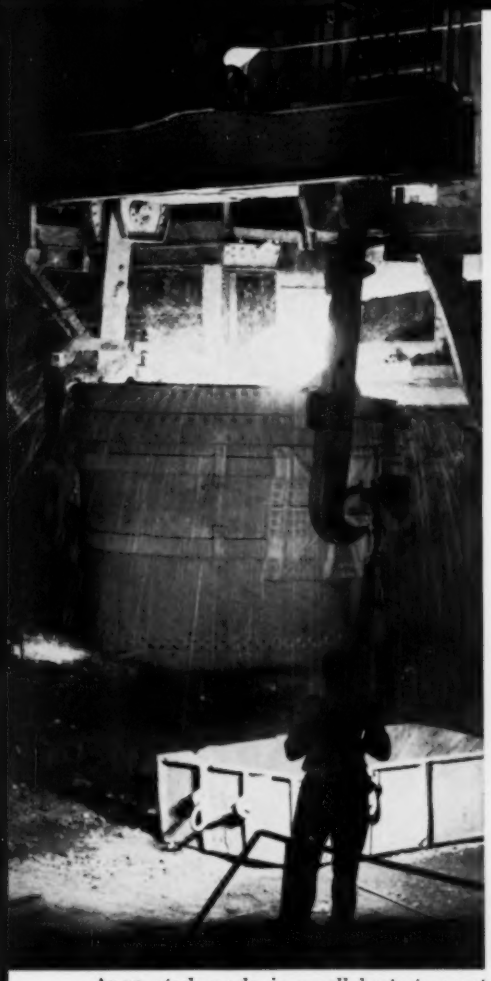

ALCO *steel, made in small heats to exact metallurgical specifications, is your assurance of high-quality forgings.*

ALCO's *regular forgings offer many opportunities for cost reduction in machine set-up and tooling.*

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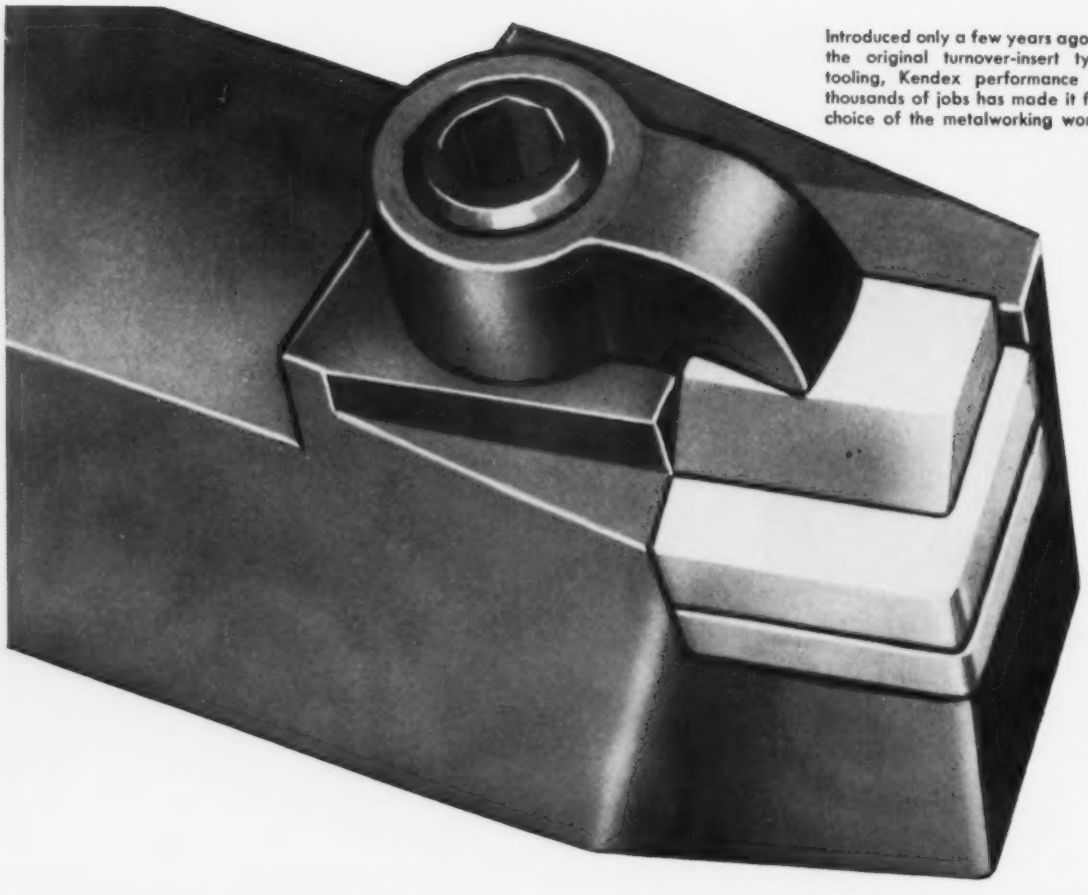

Introduced only a few years ago as the original turnover-insert type tooling, Kendex performance on thousands of jobs has made it first choice of the metalworking world.

The KENDEX* Story...from drawing board to world-wide use in four years

Originally introduced in only seven styles, Kendex turnover insert tooling is now available in 42 styles and 222 holders—made in four countries† and sold world-wide. Such spectacular acceptance means that Kendex tooling is correct in design, sound in construction and is being used profitably on thousands of operations.

Further proof of the economical soundness of the Kendex design was its application to Heavy Duty and Positive Rake tools and recently to Encased Boring Bars and Boring Heads. Simplicity . . . to minimize the number of parts and avoid any complex parts . . . has been a keynote in designing Kendex Tooling. Simplicity with rugged construction; solid Kennametal chipbreakers for positive chip control; a wide selection of inserts . . . features that have won world-wide acceptance.

Your Kennametal Tool Engineer will work with you in selecting the right Kendex tooling for your machining operations. Applying and servicing Kennametal Tooling and solving tough machining problems is his full-time job. Call him now, or write to KENNAMETAL INC., Latrobe, Pennsylvania, for the new catalog of Kendex tooling.

*Trademark †United States, Canada, Belgium, Italy

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Features that have made Kendex the World's Leader in Tooling

Solid Kennametal Chipbreaker—Kendex Chipbreakers are "all carbide," as durable as the insert beneath . . . outlast several multi-edged inserts on average jobs; can be omitted when not needed or easily modified for special requirements.

Economical Chip Control—Three standard chipbreaker widths fit *both R.H. and L.H. holders*, and take care of most jobs. Simple design provides most economical chip control ever available.

Low Contour of Kendex Chipbreakers minimizes chip interference . . . their snug fit leaves no gaps or pockets in which chips can jam.

Fast Setup—Kendex Chipbreakers and Inserts can be quickly indexed or replaced economically—as they are separate from all clamping parts. No resetting of tool required.

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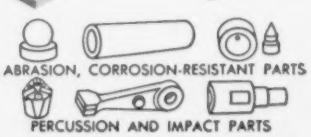

Memo to a Man of "Parts"

The number of different parts made from Roebling High Carbon Specialties, Flat Wire and Spring Steel are close to countless.

Some things you can count on, though, are the consistent dimensional and mechanical uniformity you get with any Roebling High Carbon Specialty. They are the qualities that contribute to speeding *your* production and cutting *your* costs.

They are high qualities that make for high values. Next time you need flat wire or spring steel, specify Roebling. Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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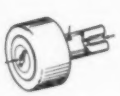
Performance features of TORRINGTON CAM FOLLOWERS

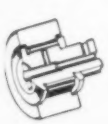
Heavy sectioned outer race to absorb high rolling and shock loads.

Integral stud for cantilever mounting, case-hardened, with tough core for high strength to withstand shock loads.



Easily relubricated at either end or through cross hole in stud. Ends accommodate standard drive grease fittings or plug seals.

Full complement of small diameter rollers for maximum radial capacity and efficient anti-friction performance.



Races precision ground for even load distribution and uniform low end play.

Built to "FOLLOW THROUGH" under high shock loads

Every feature of the Torrington Cam Follower is designed to insure efficient performance and long service life under heavy rolling and shock loads in cam or track follower service.

Precision made throughout, Torrington Cam Followers are available in sizes from ½" to 2¼" OD. Special surface finishes such as chrome and cadmium plate or oxide black can be provided.

Our engineering staff will be glad to work with you in applying these reliable units to your cam-controlled or track-type equipment. You can depend on Torrington Cam Followers to "follow through" on the job because every element is designed for ultimate capacity. *The Torrington Company,* Torrington, Conn.—and South Bend 21, Ind.

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Make "Natural" Rubber

Army reports confirm that industry can make a synthetic rubber which has properties identical to the real thing. Better yet, the synthetic product is actually superior to natural rubber in low-temperature tests. This could make the U. S. completely independent of overseas sources for rubber, and save the $20 million now spent every year for stockpiling.

Fibers Reinforce Metals

Researchers are developing a silica fiber that will withstand 600,000 psi of tensile stress. It's being produced in minute quantities from batches that average 300,000 psi tensile strength. The project is aimed at the fiber-reinforcing of non-ferrous metals. So far, copper, aluminum and zinc have been reinforced and tested.

Tinplate Picture Brightens

Look for tinplate sales to chalk up a good gain this year. January shipments were the best since last April, and can makers predict a 10 pct increase in sales for 1958. They're banking on normal growth of their business, plus a demand back-log due to last year's crop failures.

Simplify Epoxy Bonding

A new one-part epoxy resin needs no chemical activator to make high strength metal-to-metal bonds. Where the working life of two-part epoxies is usually limited from a few minutes to a few hours, the new material boasts unlimited working life. It could open the door to mass production bonding by eliminating batch techniques.

Atoms Improve Plastics

Atomic radiation is being applied to develop new and improved plastic materials. There are definite clues that some irradiated plastics will be much more resistant to heat and to stress corrosion. Fortunately, the atomic energy program affords inexpensive and readily available sources of radiation for this research.

Chatter-Free Boring Bar

A non-chattering boring bar with interchangeable tool heads is available in sizes and styles for all types of boring machines and operations. A cavity inside the bar is loaded with shot to eliminate vibration and chatter. Bars and their quick-change tool heads are said to be designed for repeat accuracies of 0.0001 in.

Europe Ups Steel Exports

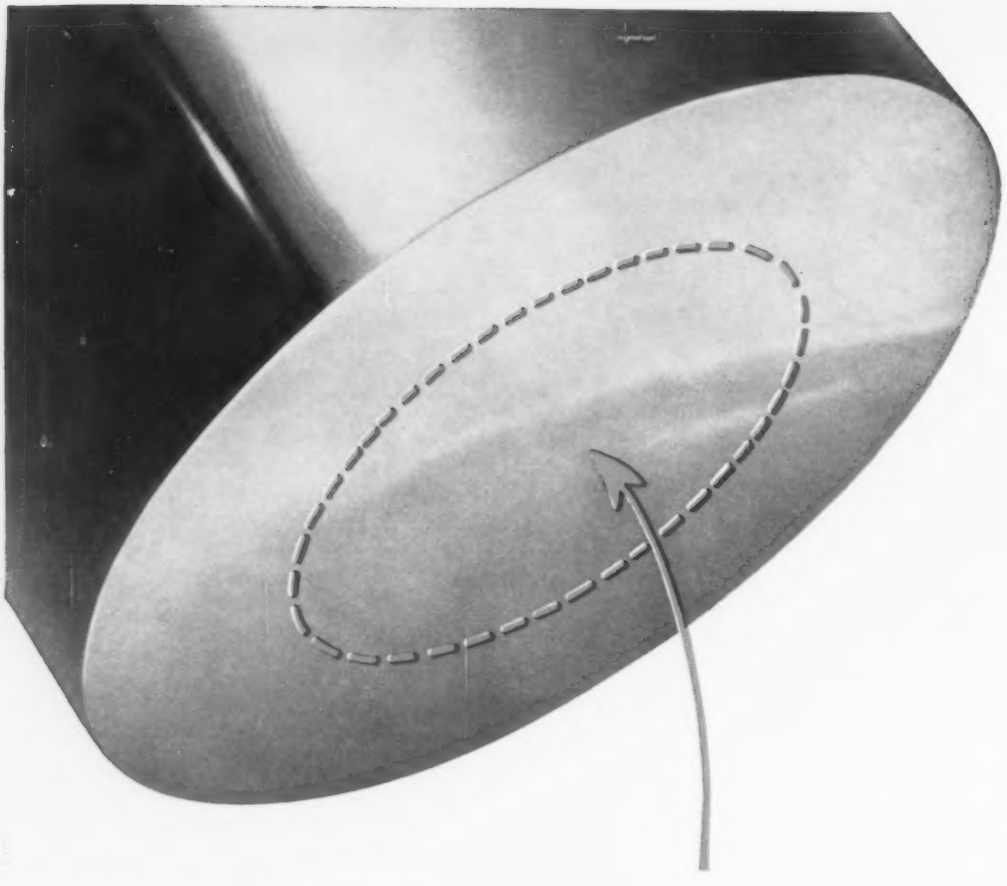
The European Coal and Steel Community now accounts for more than half of the world's steel export volume. In 1957, the Community exported about twice as much steel as the U. S. and about three times as much as Great Britain. The U. S. was actually one of the Community's best customers last year, taking in an average of almost 115,000 tons per month in the first quarter.

Predict Part Life

You can tell whether an electronic component will perform at a certain level, but how do you tell how long it will last without testing it to destruction? A university researcher figured out a nondestructive test to give this all-important answer. By measuring the rate of change in a component's operating characteristics over a short period, its useful life can be established.

Now They Tell Us

Super-secret sleuths of the Central Intelligence Agency now say they've been translating more than 1000 Russian publications a year. The Agency says 95 pct of the translated material is available to the public, and about one-third of it deals with scientific matters. Some 35,000 pages will be translated, abstracted and indexed this year, the Agency says. The cost: almost $500,000.



Here's where hollow parts makers can find new savings

IF YOU'RE boring out bar stock to make hollow parts, you can save money, time and steel. Start with Timken® seamless steel tubing because:

1. YOU SAVE THE COST OF DRILLING; the hole's already there. Finish boring becomes your first production step.

2. YOU SAVE MACHINE TIME by eliminating this costly, original boring operation. You free screw machine capacity for other jobs, increase machining stations *without* adding machines.

3. YOU SAVE STEEL BY WASTING LESS and using more of the steel you buy. You get more parts per ton of steel, because there's less metal to hog out.

And you get finished parts of better quality from Timken seamless steel tubing. We forge a solid round over a mandrel, thoroughly working the metal inside and out. This rotary piercing operation gives seamless tubing its fine forged quality and unvarying spiral grain flow. Precise control of temperature and piercing speed helps assure you of uniform quality from tube to tube, heat to heat, order to order.

To save even more steel, have our engineers recommend the one most economical tube size for your hollow parts job. We'll guarantee it to clean up to your finish dimensions. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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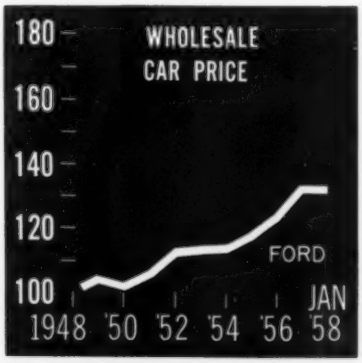
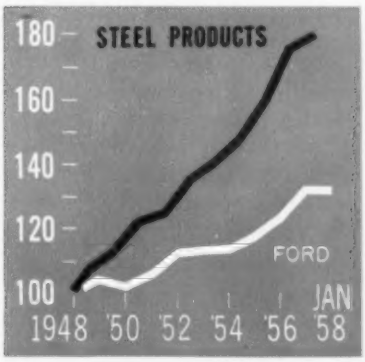
SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING

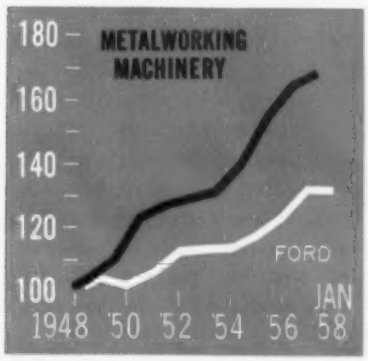
SPECIAL REPORT

Automakers Tell Capitol Hill All About Competition

Ford Car Prices Climb Less Than Costs
1948 Index = 100







Source: T. O. Yntema
Vice President, Ford Motor Co.

Industry continues to do a good job of stating the case of competition.

Sen. Kefauver and others get a good lesson in the economics of putting out an automobile.

American Motors' George Romney is only dissenting voice. —By H. R. Neal.

▪ If automobile prices are "administered," they are administered by competition of the toughest kind.

That's about all the members of Sen. Estes Kefauver's subcommittee on antitrust and monopoly could conclude last week after hearing the testimony of auto leaders, even the UAW's Walter Reuther.

Steel Had Its Day—Sen. Kefauver, it is recalled, previously put the steel industry through the same set of circumstances. By and large, industry gained more than it lost, although both hearings went way off direction at times.

The auto hearings followed shortly the UAW's new demands for a share of the profits, with a kickback to consumers thrown in. As a result, testimony frequently sounded more like labor negotiations than a Senate hearing on prices.

More To It—On those occasions when questions and testimony actually got around to pricing practices and competition among the three leading automakers, there was nothing that smacked of collusion.

There is more to pricing a new automobile than the price of steel, as was thought by committee Chairman Kefauver. Costs of all materials must be considered — rubber. aluminum, fabrics, glass, etc. Some of these prices go up from year to year, others down. Copper is down, glass is up. Rubber is less expensive, but tires are more expensive.

Curtice on Stand — General Motors president Harlow H. Curtice pointed out the total unit cost for the 1958 GM composite car rose $125 from the previous year. Material costs accounted for $35 of the increase. Steel alone accounted for $27 of that cost, primarily due to higher steel prices but also because the cars were bigger. Other material costs, including freight, were up $8 after allowing for lower prices for nonferrous metals amounting to $9.

Payroll and related employment costs were $52 higher, or 42 pct of the $125. The higher labor costs resulted from a combination of higher wage-salary and fringe benefits costs and additional labor content. Higher wages account for about $45 of the $52, or 36 pct of all unit cost increases in the last year, Mr. Curtice said.

Less Than Cost Boost — Other items that raised costs over the last year's model were special tooling, $24, and taxes, depreciation and miscellaneous costs amounting

FORD'S YNTEMA: Few commodities in which bargaining by buyer and seller plays so large a role . . .

UAW'S REUTHER: Instead of raising prices, a $100 cut at wholesale.

GM'S CURTICE: For every dollar of increase in our costs, price has increased only 60¢.

to $24. However, Mr. Curtice said, "the average increase in wholesale price was up only $74—$51 under the actual cost increase."

Ford finance vice president Theodore O. Yntema compared the wholesale selling price and costs of a 1948 and 1957 four-door sedan. During the period, he said, the price rose 32.8 pct—not counting "adjustments for tremendous product improvements" during the decade.

Ford Costs — Over the same year, Mr. Yntema said, Ford's labor rates went up 66.8 pct, steel prices 80.7 pct, machinery and equipment 69.9 pct, and components for durable goods manufacturing 46.4 pct. And "since 1955, output per manhour in the economy has been rising about 1.7 pct per yr. and still more slowly in manufacturing." He admitted this good showing over the 10 year period was due in part to the fact Ford's productivity rate was low from 1946-9, a deficiency corrected after that period.

Chrysler president L. L. Colbert cited similar cost increases for his company. In addition, he noted all of the product improvements made in cars over the years, and from year to year, as giving greater value for the dollar spent.

Meet the Competition — Then, insisted the automakers, you have to consider what the other fellow is going to do with his product and prices. Sen. John A. Carroll (D. Colo.) allowed as how this didn't sound like competition—especially when the cost of the product differed but prices of comparable makes were so much alike from year to year.

Ford's Mr. Yntema proceeded to give Sen. Carroll a lesson in elementary economics. He defended the similarity in Big Three car prices as the "essence of competition" instead of evidence of a "rigged" market.

Or Else—Later, Chrysler president L. L. Colbert, under questioning by Sen. Everett Dirksen, explained the consequences of any wide-spread pricing between comparable makes of automobiles. "If you don't match his price, you lose sales and go out of business."

GM the Target—When the committee wasn't inquiring into factors affecting pricing, which was much of the time, it went after GM's profit picture and Mr. Curtice's salary plus bonus.

If it hoped to find an ally or two among Ford and Chrysler witnesses, it was bitterly disappointed. Mr. Yntema was asked about reports that GM could kill most of its competition by price cuts. He replied "Ford could give them a rough time if they tried," but admitted some of the other companies with narrower profit margins "might not be able to."

GM was accused of being the price leader in the industry — a point that was denied by both Ford and Chrysler. Ford said it had priced its cars ahead of GM in six of the last 11 yrs. Chrysler prices were announced ahead of GM's in three of the last six.

15 Pct Profits—Mr. Curtice said GM aims for a return of 15 pct after taxes. Ford and Chrysler have no such goal, but both agreed it was their aim and duty to increase their present profit picture. They agreed with Mr. Curtice's defense of the fact GM has generally exceeded its profit goal that the "risks" involved in the auto business warrant a good return in good years. The bad years take care of the surplus. Mr. Curtice also made a point when he pointed out some 78 other companies have higher returns on net worth.

Break Up the Giants—However, one of the automakers doesn't see the Big Three auto companies in the same light they view each other. American Motors free-thinking, free-swinging president, George Romney, gave some swinging-free thoughts on the last day of hearings.

The proposal? Break up Ford, General Motors and the UAW.

Why? Too much power concentrated in a single place lessens competition. In fact, he said, a "spin-off" of some operations by the big companies would actually be a "reward" to stockholders and employes.

Two rules would apply, depending on the size and nature of the company, in deciding when and if a split should take place. In one case, aimed at GM and Ford, any company operating in more than one basic industry would split when sales reached about 25 pct of industry business. For single line firms, the split would come at a higher point, say 35 pct.

Labor, he said, should be allowed to band together for collective bargaining only with the firm where the members are employed. An exception would be affiliated unions of under 10,000 members with a single company. They could join forces with other locals for bargaining purposes. This would eliminate the evils of "industry-wide bargaining" without killing unions, he reasons.

X-Ray Silver "Mine"

▪ Prospecting for silver doesn't have to mean trudging around with a pick and shovel. Industrial X-ray users are sitting on a rich vein.

Sikorsky Aircraft Div., United Aircraft Corp., made $1347.90 in less than seven months from the recovery of 1476.55 troy oz of silver. The idea is to recover silver from old X-ray films, and from the fixer solution (hypo) used in developing the films.

Silver From Film — Sikorsky's Stratford, Conn., plant exposes 3000 sq ft of industrial X-ray film monthly inspecting production parts. Films of rejects are returned to the production dept. with the parts. But majority of the film is indexed and filed. After several months, when they are no longer of use, the film is shipped to the Bridgeport plant of Handy & Harman for refining.

Sikorsky says this recovery provides added dividends by acting as a spur in keeping files pruned and current.

Looking at Hypo—The success of this salvage program has both Sikorsky and Handy & Harman taking a long look at recovery of silver from the fixing solution. The liquid is used to make the film impression permanent. It must be constantly replaced because it becomes contaminated with silver from the film. Sikorsky uses about 55 gal every 6 weeks.

This quantity is expected to yield over 100 troy oz, worth more than $90. The hypo itself costs only $55.

Other Possibilities — Now, the solution is being shipped in bulk to Handy & Harman. But, Sikorsky is working on a method of concentrating it. This would boost the return by lowering freight charges, and reducing the refining charge, made per oz of hypo.

Sikorsky is also working on a method for continuous silver removal which would boost the life of the hypo by as much as 40 pct.

Handy & Harman has similar recovery program at other plants.

ROAD TO RECOVERY: Out-of-date X-ray plates at Sikorsky Aircraft are removed from the files and stacked in bins. They will be shipped to Handy & Harman laboratories where thousands of dollars worth of silver will be recovered. The cost is only a small toll charge.

No Room For Amateurs in Defense Business

One effect of the increasing use of radically new aircraft materials is to make defense contracting a risky business for newcomers—and amateurs.

Distortion control of many new alloys is very critical. One press manufacturer is at work on a special straightening press that will carefully straighten stampings at 1800°F. Several heat treaters have had to rebuild their furnaces to handle difficult jobs. And support of the workpiece while heat treating is virtually an art.

It has even been necessary to hold parts in the original die while heat treating them, to avoid warpage of high cost forgings.

Difficulty of machining these tough materials is becoming a recognized and serious problem. Machine tool builders and machine shop operators are debating whether a massive Government-subsidized metal cutting research program may be needed to find the answer.

The big problem is how to machine the super-hard, super-tough alloys with any degree of speed. (The IRON AGE, Feb. 6, '58, p 81). At the present time, the job is an agonizingly slow one. Any attempt to speed up the removal of metal usually winds up in defeat for machines and cutting tool edges.

High Speeds Need New Alloys

New aircraft and missiles traveling at Mach 3 or better need new steels to combat high fuselage temperatures.

New alloys and other new products are solving some of the growing heat problems of travel into space.

▪ High speed, high temperature aircraft are developing into an increasing market for steel—steel that remains stable at 1000°F and higher.

Hot-work die steels, precipitation hardenable semi-austenitic stainless, and precipitation hardenable austenitic steels are all gaining ground in high speed aircraft and missile use.

More to Come—Still coming are the metallo-ceramics. Fibers of a refractory metal combine with a refractory oxide to form a tough, heat-resistant coating over aircraft and missile parts.

Thorium oxide and molybdenum fibers could be an example. They will withstand 3000°F and more. Since the oxide turns to a gas as it decomposes, the material resists spalling. It will be prestressed, in the manner of a concrete prestressed bridge beam. A refractory has been developed along different lines that has already withstood 12,000°F for a short period.

Heat Thicket—The sound barrier passed, U. S. missiles and aircraft must now penetrate the "heat thicket." At 40,000 ft, an aircraft flying at Mach 2 (1200 to 1300 mph) encounters 200° to 250°F skin temperatures as air molecules hit its wing surfaces.

At Mach 3 (1900 mph), skin temperatures climb to 550°F. At Mach 4 (2500 mph), the wings and fuselage heat to 800°F and temperatures may go to 1000°F.

Needed for Missiles—The U. S. supposedly doesn't have aircraft that exceed Mach 3, but there are missiles that strike at those speeds and require 1000°F plus temperatures.

The Nike Hercules is in production and it travels at Mach 3. Talos hits Mach 3.5 or Mach 4. A recent announcement disclosed a missile that travels at Mach 3.95. It's believed that the Thor IRBM travels at Mach 10, roughly 6000 mph, and that Atlas and Titan exceed 10,000 mph.

The nineteen X-17's launched to test nose cone re-entry may have hit higher speeds. The goal is a manned "far-hypersonic bomber" of 18,000 mph rating which is, in effect, a space ship.

Progress Is Good—Behind the scramble for newer, higher heat-resistant alloys is the fact that the U. S., Sputnik or no, has progressed farther than most taxpayers believe. Testing equipment is already in use to stimulate flight heats of 15,000°F, speeds of Mach 10 to Mach 20, while applying pressures of 20,000 psi to the model under test.

Results are encouraging. Thor

was designed as a 1500-mile range. But it went almost 2500 miles under test. An Air Research and Development Command officer commented recently: "I can give you a little performance data, but the way things are breaking it will probably be obsolete before you can get it in print."

Graduates from Dies—To smash through the heat thicket, steels that were once available only as die blocks are now available as sheet. It is being rolled on continuous mills or hand mills, in widths up to 48 in. A growing amount is being shipped from the mills as forging billets.

A few of the steels are veterans, dating back to 1948. Several alloys are so new they still must be tested.

The Producers — United States Steel, Allegheny Ludlum, Armco, Republic, Eastern Stainless, Universal Cyclops, Vanadium Alloys, Jessop, Carpenter Steel, Crucible Steel, Timken Roller Bearing and Washington Steel, to name the most prominent, are producing high temperature aircraft steels and developing others.

There are plans for a modified high-cobalt, high-nickel alloy that will withstand 1400° to 1600°F operating temperatures.

The engine heat problem is already critical. One of the conventional production line aircraft engines holds gas burning at 3200°F in its afterburner. The afterburner walls reach temperatures of 1200°F. But researchers now talk of gas temperatures in the 5000° to 8000°F temperature range.

New AMF President

Carter L. Burgess has been elected president of the American Machine and Foundry Co. He will be the number two executive officer under Chairman Morehead Patterson.

Mr. Burgess was formerly president of Trans World Airlines. He resigned the beginning of the year.

EARLY LESSON: A general Electric engineer sips coffee and absorbs course in Russian language over station WRGB-TV, Schenectady, N. Y.

TV Teaches Russian

▪ Early risers within television range of Schenectady, N. Y., have a chance to learn the Russian language merely by flicking on their TV sets.

General Electric's station WRGB is telecasting the program from 6.30 to 7 a.m. on Tuesdays and Thursdays. The first lesson began Feb. 4 and will continue for 14 weeks.

Technical Reasons—Because of the high percentage of engineers and scientists in the area, the program is aimed at persons who might want to read Russian technical material. But the course is not considered too tough a nut for the general public.

The teacher is Dr. Irving S. Bengelsdorf of GE's Research Laboratory, who says the course is expected to help bridge the gap in America's knowledge of what the Soviet's are up to—technologically.

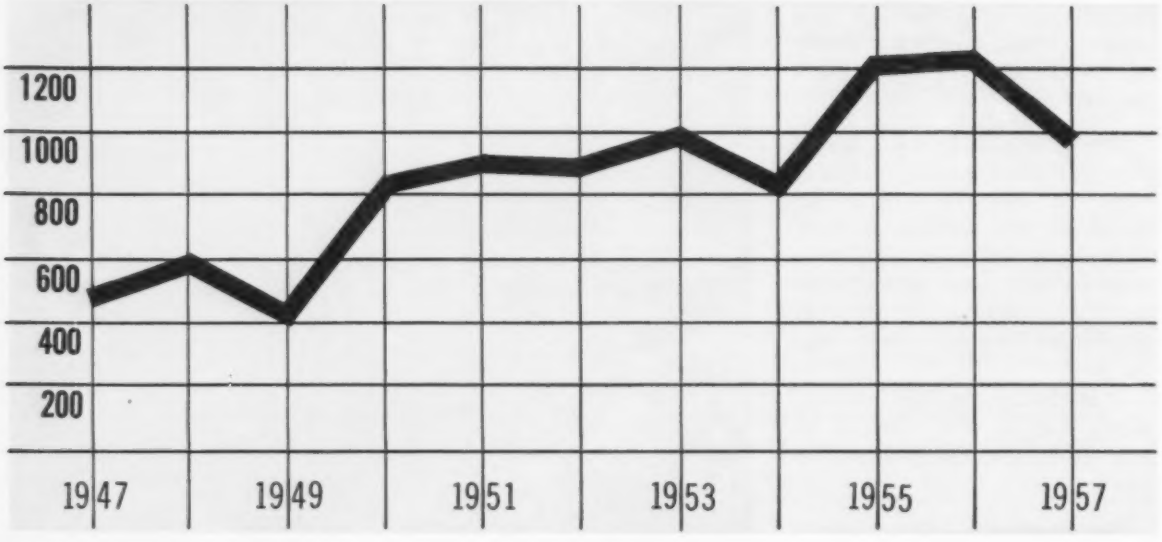
One Way Street—"There is a great deal of technical information being published by Russian scientists," Dr. Bengelsdorf commented. "This knowledge could be ours for the taking if we knew how to read the language."

He pointed out that Russian technologists are taught English in school and so are able to keep up with American technical developments. "There is no reason why information should continue to flow in only one direction," he said.

The course is sponsored jointly by WRGB, the Mohawk-Hudson Council on Educational Television, and the Northeastern branch of the American Chemical Society. It is claimed to be the first attempt to teach Russian over TV.

Stainless Plans for a Good Year

Production of Stainless Steel In Thousands of Tons



Producers of stainless steel predict they will produce over the industry average this year.

1957 was the fourth best in the industry's history in spite of a serious fourth quarter setback. —By G. G. Carr.

▪ Stainless steel producers have brushed off the welcome mat for customers. Recent selective price adjustments spell out today's competitive market, low order volume. But producers are not pessimistic. They feel 1958 stainless sales will run, percentagewise, significantly ahead of overall steel industry performance. And they are confident the long-range outlook is shinier than ever.

Final 1957 figures will show production of about 1,006,000 tons of stainless steel ingots and steel for castings. This figure is under the 1956 record total of 1,255,725, but still good enough to make last year the fourth best in the industry's history—and high enough to continue the boast that stainless output virtually doubles every 10 years.

One Disappointment—Unkindest cut to the producers was failure of expected fourth quarter business to materialize. American Iron and Steel Institute figures tell the story: Nine-month total shipments in '57 were 539,697 tons against 561,422 tons for the same period in 1956. And the industry confidently expected a fourth-quarter order spurt. But the new business never showed up; 11-month shipment totals were only 584,339 tons against 625,312 tons for the same period in 1956.

But the industry hopes the bottom has been reached, that orders are starting to turn up. So far it's too early to call it a trend, but there are some straws in the wind. Here and there a mill reports that January orders are above December; a leading producer reports orders have been up sharply in the last two weeks; a large stainless warehouse was happily surprised by December sales totals; stainless plate continues to hold up.

Nickel Eases—Newly-announced price cuts by leading producers of about 1 pct on types 304 and 316 sheet and c-r strip are not panic signals, producers warn. Rather, it is a question of meeting competition in a soft market. One large producer estimates it will lose more in dollars by a reduction in polishing extras than in the base price cuts.

Whitest hope for stainless producers is easier nickel supply. For longer than they like to recall, stainless salesmen have been soft-pedaling certain promising applications. Reason: The applications required stainless grades containing more nickel than has been easily available. Now, with nickel producers making sales calls once again, stainless mills are pushing all markets zealously, confident that there will be all the nickel they may need.

200 Series Gains—The nickel-lean 200 series rang up further sales gains in 1957, but the future is somewhat clouded, at least until the next nickel crisis. Partisans can point to a wide range of applications, but the tonnages involved remain very small.

It is notable that of the 50-odd varieties of stainless steel for which AISI reports ingot production, only nine showed increases in 1957 over 1956. Virtually all of these nine are new grades, introduced in the last two years, and representing further

refinements in stainless technology. Significantly, several of these grades are designed to permit better and easier welding.

Detroit Buys Most—Among customers, Detroit remains Mr. Big. Stainless shipments to the auto industry at the three-quarters mark in 1957 stood at 76,757 tons, against 70,044 tons in '56.

Good news to the stainless mills was recent announcement by Manufacturing Chemists' Assn. that its industry will spend $2.54 billion on new plant in the next two years. Chemicals are a major stainless market. The related food processing industry, also a large stainless user, continues to grow, and dairy and milk processing applications look particularly promising.

Missile Prospects—The stepped-up missile program promises to require large quantities of stainless. Mills are little worried by reports of glamorous new high-temperature materials. Use of such materials, even when widely available, will probably be confined to special applications they feel.

Producers point out that more or less conventional aircraft use large and growing amounts of stainless. Major Gen. D. H. Baker, Capital Airlines president, estimates that military aircraft may require 35,000 tons of stainless yearly by 1960, or about five pct of total U. S. consumption. And Republic Steel Corp. has predicted that about 50 pct of future supersonic aircraft and engines will be made of stainless steel.

Atomic energy may well be the largest percentage user of stainless. As more nuclear units are built, shipments to this market will grow sharply in tonnage. Some industry observers believe it will some day be the No. 1 stainless customer.

New Silicon Furnace

Ohio Ferro-Alloys Corp. has started up the first electric furnace at its new reduction plant near Powhatan Point, O. This is the first of three new submerged arc furnaces being built to turn out silicon metal.

Strapping Brightens

▪ You have to look close to see it, but steel strapping order books are starting to fatten. Many forecasters consider this industry a good barometer.

It's no boom. Steel strapping men caution (1) some new orders are from firms which customarily reduce manufactured inventories prior to tax time, and (2) much of the gain may come from buyers who deliberately ran their strap inventories down to dangerous levels through 1957, and must now restock for the spring manufacturing peak.

Look to Second Half — Strappings' own forecasters pretty much agree the first half will be slow, the second half will show solid improvement. At this point agreement ends. Some see pickup as early as July as customers rebuild depleted inventories. Others expect the normal summer slump followed by a fourth quarter that will "stand your hair on end."

Overall, here's the way most forecasters see the shipments picture: 1957 will prove to be down 30,000 tons from 1956 to about 370,000 tons; 1958 will about match this, possibly rising to as much as 380,000 tons. There are few predictions of a sag.

Sales Battle—With the market expected to hold, the only chance strapping makers see to gain ground is to increase their share of it. Many have already announced new equipment. And there is a lot being held in reserve for the stiff spring battle.

Some of the fields strappers are courting are more brick packaging business, more lumber, synthetic rubber, columnar form bracing.

Cause of Upswing—Actually the business upsurge stems from older customers. Hold orders and order cancellations that plagued the industry through the third and fourth quarter are being lifted.

MARKETS: Steel strapping customers are adjusting buying upwards.

MIRROR SMOOTH: Stainless steel sheets are polished to No. 4 finish on a Hill-Acme 48-in. belt grinder.

Belt Grinders Woo Sheet Mills

Having proved itself in automotive uses, the abrasive belt grinding industry is spreading its wings.

Offers promise as method for polishing hot-rolled and stainless sheets.—By T. M. Rohan.

▪ Abrasive belt grinding is polishing off a big market for itself these days and shooting for a bigger one.

This year bumpers on all new U. S. cars are being made from mild steel sheet pre-polished in continuous stands of abrasive belt grinders. This clean sweep of the field culminates a trend that began after World War II.

New Trends Started—Now abrasive belt makers and grinding machine builders are launching a campaign to have steel mills install belt grinders to polish hot-rolled sheet. It could then be sold as a lower-price substitute for cold - rolled where fine surface quality is the top requirement.

Custom polishing, principally of stainless steel, is also on the increase with about 18 independent plants now doing business in the U. S. in addition to those in producing mills.

New markets are opening up for belt grinding of wide sheets of stainless, titanium, and aluminum for tight aircraft and missiles specifications.

Bypasses Pickling — For steel mills, belt grinders following a scale breaker and shear would eliminate pickling tanks and expensive cold-rolling mills, abrasive makers claim. They also would use less power.

Coiled sheet would speed up the process but has not been used so far because it is time consuming to pull out imperfect areas for re-polishing. Mills most likely to install grinding lines would be those with excess hot-rolled sheet capacity.

Volume Market—It is estimated that the polishing extra would cut the price spread between hot-rolled and cold-rolled sheet in half. Hot-rolled sells for 4.925¢ per cwt, Pittsburgh base, cold-rolled 6.05¢.

For the abrasive belt manufacturers the steel mills are a potential lush repeat market. And grinder firms are developing machines to remove all types of scale from steel. Cost of belts used in a year on such applications as bumper sheet grinding equals the cost of the machine.

Independents Grow — Custom polishing houses find their major market in stainless steel for the dairy and food, aircraft, restaurant, and kitchen equipment industries.

Originally, mills did their own grinding of a limited number of surfaces. Now the variety is up to eight major grades. Because most of the jobs were small lots involving special protective packaging, many mills pulled out of it.

Now the custom polishing houses are laying in their own stocks of stainless sheets and bars, aluminum, titanium, inconel, brass, mild steel sheets, and plastics.

Plastics Adapt to Missile Age

Protect Parts at Metal-melting Temperatures

Reinforced plastics are gaining more use in many space age assignments.

Their shock resisting and insulating properties are valuable for many parts in missiles.—By K. W. Bennett.

▪ Where do plastics fit into the missile picture? Some of the answers were brought out at the 13th annual conference and exhibit of the Society of the Plastics Industry, Reinforced Plastics Div., in Chicago last week.

They are appearing on U. S. missiles and aircraft in engine liners, tail fin and control surfaces, radomes, nose cones, and insulating rings for the hottest spot of all—the nozzle area of the new solid fuel missiles.

So far these materials have been used on smaller missiles (the Genie and Hawk) but they are also going to appear on the Polaris and the Pershing, a solid fuel version of the Jupiter.

High Temperature Test — Reinforced plastic gets the call because it's clearly in front when a high-strength, highly heat resistant material is wanted, say industry leaders.

Phenolic resins over a nylon base have held up for 18.5 seconds at over 12,000°F temperatures. (For purposes of comparison a blast furnace interior is about 3000°F and a copper rod vaporizes at 12,000°F.)

Unofficially the material lasted as long as five minutes at 12,000°F. The plastic charred down from the surface at a gradual rate. The outer skin of char remained at a uniform thickness leaving the plastic beneath it unaffected, until the charred outer skin burned down to the base material. The Jupiter C which launched our first satellite was protected with such materials.

Good Shock Resistance — This means that a lightweight, insulating cover is available to protect a metal support for short periods in heats that would melt any metal and vaporize many.

The reinforced plastic materials show equally good thermal shock resistance. Test specimens stand up to a 100°F rise per second up to 1000°F. And the plastics are being aimed for longer exposure at elevated heat.

Goodyear is developing large aircraft radomes that will operate at 500 to 2500°F for long periods of time. Reinforced plastics are being used to line rocket engine firing chambers and in nozzle areas, where temperatures may range from 4000 to 6000°F. The insulating qualities of the reinforced plastic are excellent. The Jupiter C is expected to reach 9000°F skin temperatures, yet insulated internal areas will not exceed 100°F.

Tanks of Wound Plastic — Reinforced plastic fits into the missile program in another respect. The Explorer—carrying Jupiter C went up with nine tanks of "filament-wound" plastic containing helium for the rocket's hydraulic system. The tanks are rated at 3000 psi internal pressure, will test to 5000 psi.

Resin coated threads of reinforcing fiber are wound over a plaster or aluminum mandrel to form a tank, which is then cured to set the resin in permanent form. Rocket men claim the resulting tank can be 25 pct lighter than steel but just as strong.

IN THE AIR: Typical of new uses of plastics in the aircraft industry are these parts of the Martin PBM Marlin. They include a cone assembly, housing assembly, face panel, spars, stiffeners and other parts.

Detroit Paces Metal Powder Use

But Non-Automotive Applications Increase

The auto industry remains the biggest customer for parts made of powdered metal.

However, technical advances in powder metallurgy are improving its market potential.

▪ Detroit still ranks as the largest user of powder metal parts, but non-automotive applications are growing.

Automotive consumption is high, the Metal Powder Association reports, because every auto produced contains about 100 powder metallurgy parts. These include self-lubricating bearings, timing gears, oil pump gears, door cams and latches, contact points.

Buyers Are Varied—Outside of automotive use there's a wide range of industries represented in powder metal applications. The appliance industry where use of metal powder parts is growing steadily is second best customer. Hardware manufacturers are other important buyers. Iron powder is also used for metallic friction materials, such as brake linings. And electronic and magnetic uses account for about 4 pct of powder metal consumption.

Iron powder applications remain overwhelmingly industrial, although an important 60 tons was used by the pharmaceutical industry last year. Industrial uses are split almost evenly between structural parts (47 pct) and coated welding electrodes and powders for flame cutting of metals (43 pct).

Aircraft Uses Grow — Aircraft applications continue to grow through technical developments. A major development has been sintered aluminum powder (SAP) metallurgy process. Parts made by this process are reported to have useful operating temperatures 300°F higher than if made of conventional aluminum alloys. Also in the aircraft field, rockets and missiles are using powder metallurgy products and techniques for such parts as fuel components and filter media.

Improvements Help—Technical advances are a spur to the industry's potential. Quality and uniformity are being more closely controlled. Pressing and sintering characteristics have improved. Press makers have developed bigger and better presses, sintering furnaces have been substantially improved.

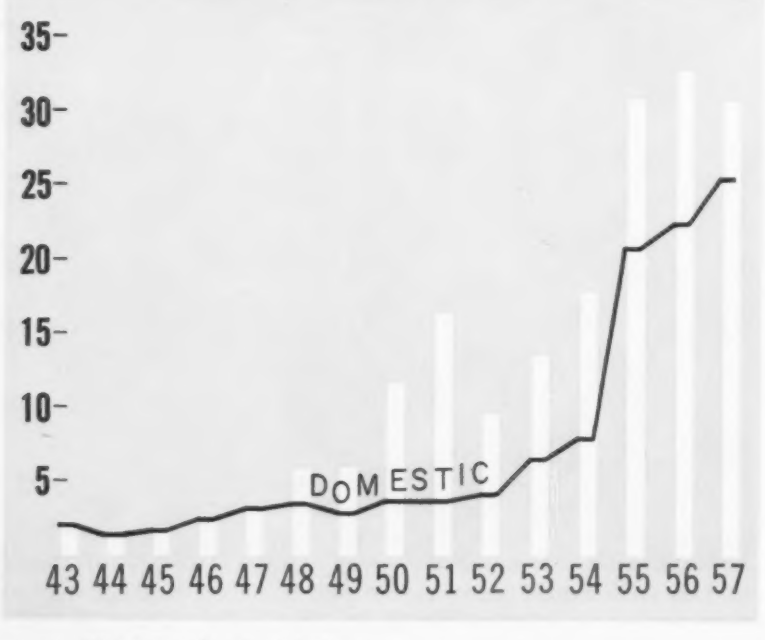
An important recent development is commercial application of infiltrated parts. These are made by first forming a porous steel structure and then infiltrating the pores with molten copper or brass to form a 100 pct dense structure. The resulting part is said to have higher strength, wear and elongation than conventional steels.

Use Dropped in '57—In 1957, total consumption of iron powders was 30,525 tons against 32,625 tons the year before. Pattern of use of nonferrous powders—principally flake and granular brass, bronze and copper—was similar to iron powder. Commerce Dept. reports show 18,000 tons of copper base powders were used in 1957, a drop of about 1000 tons from 1956.

On a monthly basis, consumption of iron powders during 1957 followed the normal growth pattern for the industry during the early part of the year, according to the Metal Powder Assn.

Iron Powder Use Stays High

Total U. S. Shipments, Including Imports, Thousands of Tons



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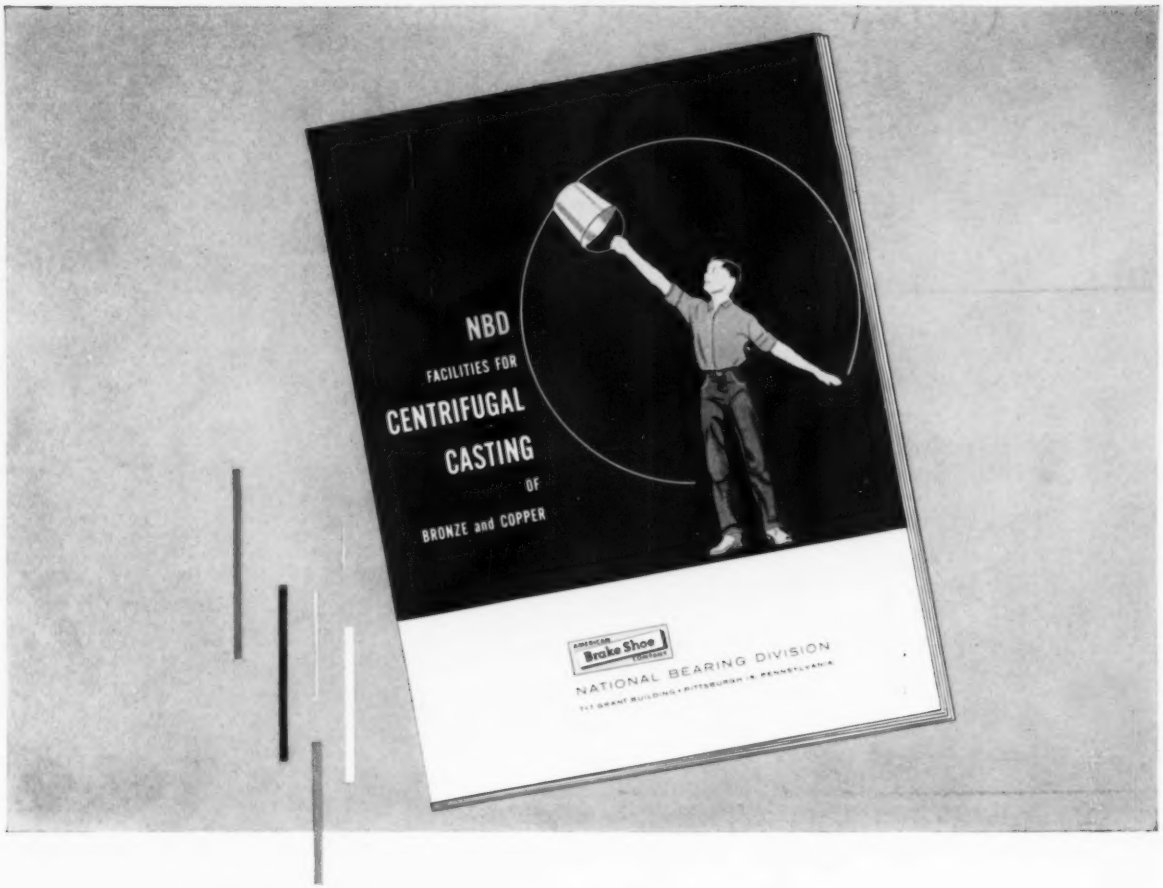

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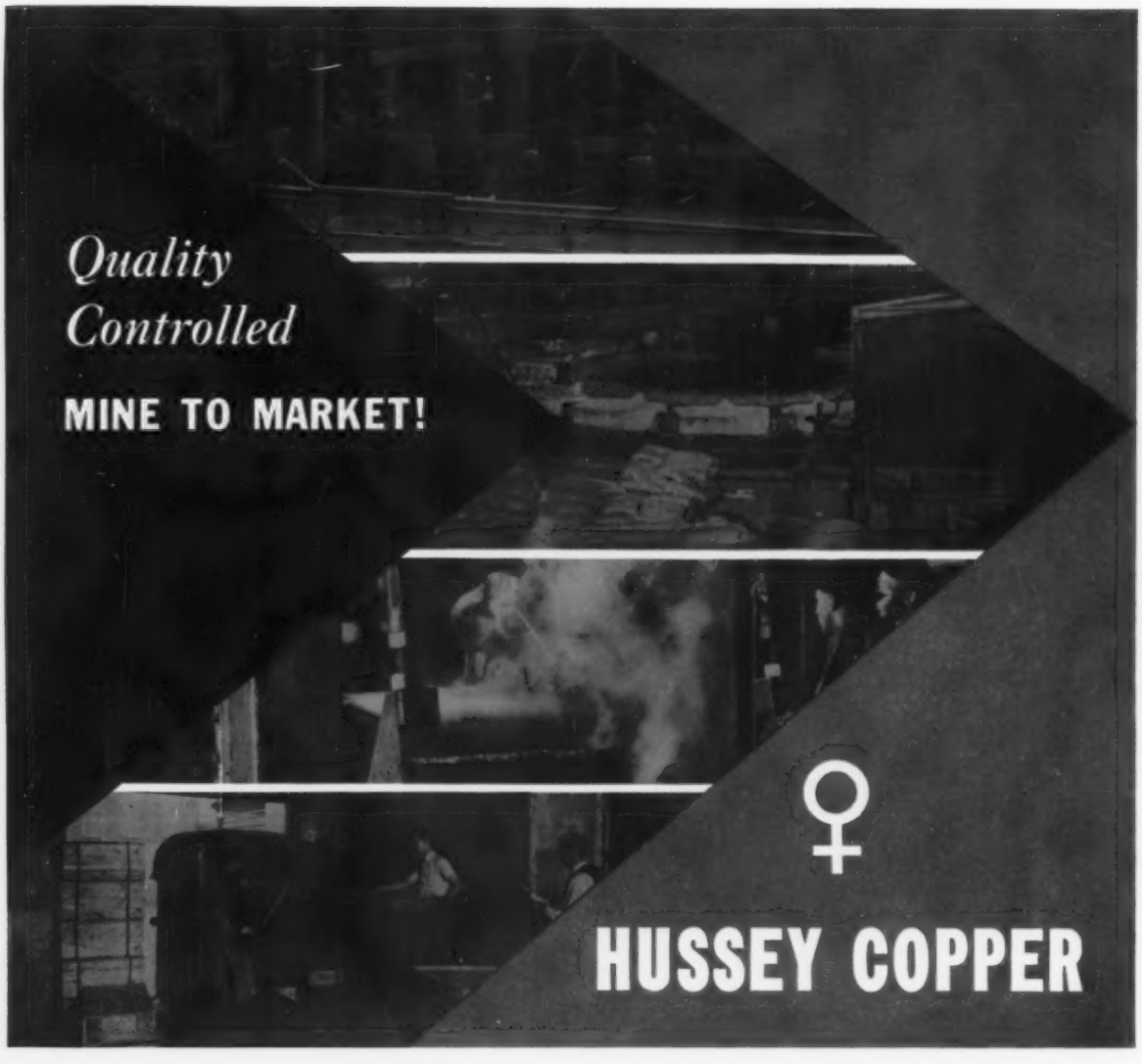

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Steel Mills Set Some Shipping Records

American steel mills shipped 79,894,577 net tons of finished mill products in 1957, the fourth best year in the industry's history, reports American Iron and Steel Institute. Several records were set for shipments both of steel products and to market classifications.

The 1957 total is off from the 83,251,168 net tons shipped during 1956. The year 1955 when 84.7 million tons were shipped is still the record..

December 1957 shipments were 5,092,913 tons down from 5,606,018 net tons in November, and 7,064,093 during September a year ago.

Product Shipments—Carbon steel shipments for 1957 were 74,531,609 tons; alloy, 4,743,213; and stainless, 619,755 tons. Corresponding shipments in 1956 were: Carbon, 77,005,056; alloy, 5,558,413; and stainless, 687,699.

New records were shipments of heavy structural shapes and electrolytic tinplate. Structural shipments totaled 6,817,796 tons, and electrolytic tinplate, 4,676,482. Other records: Line pipe, 4,218,513 tons; oil country tubular goods, 2,822,854; and steel piling, 569,673 tons.

Markets—Principal market classifications for steel shipments during the year were warehouses and distributors, 19.3 pct; automotive, 18.9 pct; and construction including maintenance, 16.6 pct.

A record was set in shipments to construction of 12,523,285 tons against the previous record of 10,441,126 tons set in 1956. Still another record was shipments to warehouses and distributors for the oil and gas industry—2,232,742 tons.

A separate market classification, covering all shipments to the oil and gas industry, also set a record last year of 6,493,750 net tons, an increase of 912,000 tons over the former record of 5,581,934 tons set during 1956.

House Warming for Inland

DIGNITARIES: Gov. William G. Stratton of Illinois, wields the scissors to officially open the new Inland Steel Co. headquarters, to be the first major new building on Chicago's Loop in 20 years. On the governors right is Inland vice president Leigh B. Block. On his left are Richard Daley, Chicago's mayor, and Inland President Joseph Block.

Automatic Launcher

American Machine and Foundry Co. has developed what it calls the first automatic missile loading and launching equipment for firing ground-to-air missiles. The launcher, developed under a subcontract from Radio Corp. of America, has been made a part of the Talos Defense Unit.

Each TDU contains a missile handling and assembly area, two automatic launchers, each supported by a missile storage magazine resembling a railroad roundhouse. The missiles can be unloaded as well as loaded automatically with the new equipment.

Isotopes in Industry

The Atomic Industrial Forum reports 195 industrial firms started using radioactive byproduct materials in 1957. This runs the overall total to 1316.

Of the new users, 65 use isotopes for gaging and 59 for radiographic inspection.

The new additions accounted for a 38 pct increase in the number of food or agricultural processors using radioactive material, 24 pct more research and testing firms, 23 pct increase in firms making piping, valves and tanks; 15 pct boost in other metalworking firms, 14 pct more petroleum companies and allied firms, 13 pct up in paper and plastics, and 12 pct more electrical equipment, electronics and instrumentation.

Geographically, Illinois gained the most ground in percentage of new radioactive isotope users, followed by California and New Jersey.

New York still accounts for the largest number of industrial users, followed by California and Pennsylvania.

The IRON AGE

Official Steel Ingot Capa

Ingot Capacity by Districts

CHICAGO

DISTRICT—COMPANY	Rated Annual Capacity—Net Tons				
	1958	1957	1956	1955	1954
Alco Products, Inc.	.....	.....	.....	.....	78,000
American Steel & Wire Div.	973,000	973,000	973,000	973,000	973,000
Borg Warner Corp.					
Chicago	100,000	100,000	100,000	100,000	100,000
New Castle, Ind.	64,000	64,000	64,000	64,000	64,000
Total	164,000	164,000	164,000	164,000	164,000
Columbia Tool Steel Co.	6,600	6,600	6,600	6,600	6,600
Continental Steel Corp.	420,000	420,000	394,000	394,000	394,000
A. Finkl & Sons	33,600	33,600	33,600	33,600	38,600
Inland Steel Co.	5,800,000	5,500,000	5,200,000	5,000,000	4,700,000
International Harvester Co.	1,200,000	1,200,000	1,000,000	1,000,000	1,000,000
Joslyn Mfg. & Supply Co.	37,500	37,500	37,500	37,500	37,500
Northwestern Steel & Wire Co.	825,000	825,000	825,000	825,000	825,000
Republic Steel Corp.	1,697,000	1,392,000	1,232,000	1,232,000	1,232,000
United States Steel Corp.*					
Gary	7,204,000	7,204,000	7,204,000	7,196,000	7,117,000
South Works	5,441,000	5,441,000	5,441,000	5,470,000	5,470,000
Total	12,645,000	12,645,000	12,645,000	12,666,000	12,587,000
Youngstown Sheet & Tube Co.	3,280,000	3,144,000	2,738,000	2,676,000	2,656,630
TOTAL Chicago District	27,081,700	26,340,700	25,248,700	25,007,700	24,588,730

PITTSBURGH

Allegheny Ludlum Steel Corp.	746,700	746,700	746,700	746,700	746,700
Alco Products, Inc.	104,460	105,160	105,160	103,000	103,000
American Steel & Wire Div.	1,015,000	1,015,000	1,015,000	1,015,000	1,015,000
Armco Steel Corp.	557,000	547,000	543,000	499,000	499,000
Babcock & Wilcox Tube Co.	229,450	229,450	229,450	229,450	229,450
Bethlehem Steel Co.	2,400,000	2,330,000	2,330,000	2,330,000	2,280,000
Braeburn Alloy Steel Corp.	20,730	20,730	20,730	20,730	20,730
Byers, A. M. Co.	90,000	90,000	90,000	75,000	75,000
Colonial Steel Co.	30,000	30,000	30,000	30,000	30,000
Crucible Steel Co.	1,356,000	1,356,000	1,356,000	1,284,000	1,284,000
Edgewater Steel Co.	117,600	117,600	117,600	89,880	89,880
Firth Sterling, Inc.	20,040	20,040	20,040	20,040	20,040
Heppenstall Steel Co.	55,550	55,550	55,550	55,550	55,550
Jessop Steel Co.	35,740	35,740	33,490	33,490	33,490
Jones & Laughlin Steel Corp.					
Aliquippa	2,180,000	1,900,000	1,764,000	1,764,000	1,764,000
Pittsburgh	3,300,000	3,300,000	3,097,500	3,097,500	3,097,500
Total	5,480,000	5,200,000	4,861,500	4,861,500	4,861,500
Latrobe Steel Co.	24,000	24,000	24,000	24,000	24,000
Mesta Machine Co.	105,000	105,000	105,000	105,000	105,000
National Tube Div.	1,446,000	1,446,000	1,446,000	1,446,000	1,446,000
Pittsburgh Steel Co.	1,416,000	1,320,000	1,320,000	1,404,000	1,404,000
Union Electric Steel Corp.	25,000	26,760	26,760	26,760	26,760
Universal-Cyclops Steel Co.	70,160	70,160	70,160	70,160	70,160
United States Steel Corp.*					
Clairton	1,064,000	1,064,000	1,064,000	1,064,000	1,064,000
Duquesne	1,521,000	1,521,000	1,503,000	1,462,000	1,462,000
Edgar Thompson	2,179,000	2,179,000	2,179,000	2,179,000	2,179,000
Homestead	4,267,000	4,043,000	4,035,000	3,766,000	3,570,000
Johnstown	25,000	25,000	25,000	25,000	25,000
Vandergrift	.....	.....	.....	.....	275,000
Total	9,056,000	8,832,000	8,806,000	8,496,000	8,575,000
Vanadium-Alloys Steel Co.	12,000	12,000	12,000	12,000	11,910
Vulcan Crucible Steel Div. (H. K. Porter, Co., Inc.)	9,600	9,600	9,600	9,600	9,600
TOTAL Pittsburgh District	24,422,030	23,744,490	23,373,740	22,988,870	23,915,780

* Central operations.

PHILADELPHIA

DISTRICT—COMPANY	Rated Annual Capacity—Net Tons				
	1958	1957	1956	1955	1954
Alan Wood Steel Co.	800,000	800,000	625,000	625,000	625,000
Armco Steel Corp. (Rustless Iron & Steel Div.)	102,000	102,000	102,000	102,000	102,000
Baldwin-Lima-Hamilton Corp.	188,710	189,960	189,960	189,960	189,960
Bethlehem Steel Co.					
Bethlehem	3,900,000	3,750,000	3,500,000	3,214,000	3,214,000
Sparrows Point	8,200,000	6,200,000	6,200,000	6,200,000	5,750,000
Steelton	1,500,000	1,500,000	1,500,000	1,356,000	1,356,000
Total	13,600,000	11,450,000	11,200,000	10,770,000	10,320,000
Carpenter Steel Co.	86,600	86,600	73,700	85,800	85,800
Claymont Steel (C. F. & I.)	506,500	499,500	499,500	499,500	494,570
Henry Disston & Sons, Inc. (H. K. Porter Co., Inc.)			25,000	25,000	25,000
Eastern Stainless Steel Co.	80,000	80,000	80,000	32,000	32,000
Harrisburg Steel Corp.	100,750	100,750	100,750	100,750	100,750
Lukens Steel Co.	750,000	750,000	750,000	750,000	750,000
Midvale-Heppenstall Co.	157,700	163,350	325,000	347,100	353,370
Milton Steel Products Div. (Merritt-Chapman & Scott)	90,000	90,000	90,000	67,000	43,000
Phoenix Iron & Steel Co. (Barium Steel Corp.)					
††Harrisburg	486,760	486,760	490,000	406,000	406,000
**Phoenixville	360,000	360,000	360,000	432,000	432,000
Total	846,760	846,760	850,000	.....	.....
J. A. Roebling's Sons Co. (C. F. & I.)	235,000	235,000	235,000	235,000	235,000
United States Steel Corp.	2,400,000	2,200,000	2,200,000	2,200,000	2,200,000
TOTAL Philadelphia District	18,944,020	17,543,920	17,295,910	16,847,110	16,374,450

VALLEY (Youngstown)

Copperweld Steel Co.	660,000	660,000	618,380	618,380	618,380
Damascus Tube Co.	.....	.....	.....	.....	1,800
Empire Steel Co.	500,000	500,000	500,000	500,000	455,000
Industrial Forge & Steel, Inc.	84,000	48,600	48,600	48,600	48,600
Mesta Machine Co.	66,000	36,000	.....	.....	.....
Republic Steel Corp.					
Canton	1,025,000	1,315,000	1,125,000	1,125,000	1,125,000
Massillon	620,000	620,000	620,000	620,000	620,000
Warren	1,408,000	1,000,000	900,000	900,000	900,000
Youngstown	2,053,000	2,189,000	2,142,000	2,142,000	2,142,000
Total	5,106,000	5,124,000	4,787,000	4,787,000	4,787,000
Sharon Steel Co.					
Farrell	1,396,000	1,305,000	1,170,000	1,000,000	1,000,000
Lowellville	593,000	593,000	593,000	550,000	550,000
Total	1,989,000	1,898,000	1,763,000	1,550,000	1,550,000
Timken Roller Bearing Co.	700,000	700,000	700,000	648,000	648,000
United States Steel Corp.	2,943,000	2,943,000	2,943,000	2,943,000	2,943,000
Youngstown Sheet & Tube Co.					
Brier Hill	1,448,000	1,368,000	1,248,000	1,176,000	1,182,000
Campbell	1,772,000	1,728,000	1,764,000	1,668,000	1,662,000
Total	3,220,000	3,096,000	3,012,000	2,844,000	2,844,000
TOTAL Valley District	15,268,000	15,005,600	14,371,980	13,938,980	13,896,780

†† Previously reported as Central Iron & Steel Co.

** Formerly only capacity reported for Phoenix Iron & Steel Co.

pacities By IRON AGE Districts

Source:
American Iron and Steel Institute

WESTERN

DISTRICT—COMPANY	1958	1957	1956	1955	1954
Bethlehem Pacific Coast Steel Co.					
Los Angeles	478,000	478,000	452,000	402,000	402,000
San Francisco	276,000	276,000	252,000	252,000	252,000
Seattle	246,000	246,000	246,000	246,000	246,000
Total	1,000,000	1,000,000	950,000	900,000	900,000
Cabot Shops, Inc.	14,500	14,500	12,000	12,000	550,000
Cameron Iron Works	58,800	58,800	58,800	58,800	58,800
Colorado Fuel & Iron Corp.	1,800,000	1,800,000	1,485,000	1,485,000	1,485,000
Columbia-Geneva Steel Div.					
Geneva	2,262,000	2,077,000	1,937,000	1,879,000	1,879,000
Pittsburgh	380,000	380,000	380,000	391,000	391,000
Torrance	228,000	222,000	222,000	220,000	224,000
Total	2,870,000	2,679,000	2,539,000	2,490,000	2,494,000
Isaacson Iron Works	102,000	102,000	102,000	102,000	102,000
Judson Steel Co.	76,500	76,500	76,500	76,500	76,500
Kaiser Steel Corp.	1,536,000	1,536,000	1,536,000	1,536,000	1,536,000
R. G. Le Tourneau, Inc.	90,000	83,100	83,100	83,100	83,100
Lone Star Steel Co.	660,000	550,000	550,000	550,000	550,000
National Supply Co.	50,200	50,200	50,200	50,200	50,200
Northwest Steel Rolling Mills	53,000	48,600	46,000	42,000	42,000
Oregon Steel Mills	150,000	120,000	120,000	120,000	110,000
Pacific States Steel Corp.	216,000	216,000	181,770	181,770	181,770
Seidelhuber Steel Rolling Mill Co.					
Sheffield Steel Corp. (Armco)					
Sand Springs	120,000	120,000	60,000	54,000	54,000
Houston	1,284,000	1,200,000	1,050,000	1,050,000	1,050,000
Total	1,404,000	1,320,000	1,110,000	1,104,000	1,104,000
Southwest Steel Rolling Mills	45,000	45,000	45,000	45,000	45,000
Texas Steel Corp.	132,450	70,450	70,450	36,000	36,000
TOTAL Western District	10,258,450	9,782,150	9,027,820	8,884,370	8,883,290

BUFFALO

Allegheny Ludlum Steel Co.					
Dunkirk	33,000	33,000	33,000	33,000	33,000
Tonawanda	4,500	4,500	4,500	4,500	4,500
Total	37,500	37,500	37,500	37,500	37,500
Bethlehem Steel Co.	6,000,000	5,720,000	5,520,000	5,100,000	5,000,000
Erie Forge & Steel Co.	234,000	234,000	234,000	234,000	234,000
National Forge & Ordnance Co.	25,000	25,000	25,000	25,000	25,000
Republic Steel Corp.	882,000	882,000	882,000	882,000	882,000
Simonds Saw & Steel Co.	21,600	21,600	21,600	21,600	21,600
Colorado Fuel & Iron Corp.	295,000	295,000	295,000	252,000	252,000
TOTAL Buffalo District	7,495,100	7,215,100	7,015,100	6,552,100	6,452,100

DETROIT

Allegheny Ludlum Steel Corp.	3,000	3,000	3,000	3,000	3,000
Ford Motor Co.	1,898,600	1,877,400	1,877,420	1,755,000	1,755,000
Great Lakes Steel Co. (National Steel Corp.)	3,500,000	3,200,000	3,200,000	3,400,000	3,400,000
McLouth Steel Corp.	1,574,000	1,380,000	1,380,000	1,200,000	967,780
Jones & Laughlin Steel Corp.*	200,000	300,000	300,000	425,000	425,000
TOTAL Detroit District	7,175,600	6,760,400	6,760,420	6,783,000	6,550,780

CLEVELAND

Jones & Laughlin Steel Corp.	1,820,000	1,400,000	1,305,000	1,305,000	1,305,000
National Tube Div.	2,580,000	2,565,000	2,364,000	2,364,000	2,364,000
Republic Steel Corp.	3,360,000	2,860,000	2,572,000	2,572,000	2,572,000
TOTAL Cleveland District	7,760,000	6,825,000	6,241,000	6,241,000	6,241,000

* Formerly Rotary Electric Steel Corp.

SOUTHERN

DISTRICT—COMPANY	1958	1957	1956	1955	1954
Atlantic Steel Co.	400,000	400,000	450,000	300,000	300,000
Connors Steel Div. (H. K. Porter Co., Inc.)	115,000	115,000	115,000	67,500	67,500
Kilby Steel Co.	34,020	34,020	34,020	34,020	34,020
Knoxville Iron Co.	38,000	38,000	38,000	38,000	38,000
Mississippi Steel Corp.	45,000	45,000			
Newport News S. & D. Co.	15,000	12,000	12,000	12,000	12,000
Republic Steel Corp.	1,197,000	789,000	789,000	789,000	789,000
Roanoke Electric Steel Corp.	25,000	24,000			
Southern Electric Steel Co.	66,000	66,000			
Tennessee Coal & Iron Div.					
Ensley	1,770,000	1,770,000	1,770,000	1,770,000	1,745,000
Fairfield	2,227,000	2,227,000	2,227,000	2,227,000	2,086,000
Total	3,997,000	3,997,000	3,997,000	3,997,000	3,831,000
TOTAL Southern District	5,932,000	5,520,020	5,435,020	5,237,520	5,071,520

UPPER OHIO RIVER †

Ohio River Steel Div. (Louis Backman Co.)	136,080	136,080	136,080	136,080	136,080
Weirton Steel Co. (National Steel Corp.)	3,300,000	3,000,000	2,800,000	2,600,000	2,800,000
Wheeling Steel Corp.					
Benwood					
Steubenville	2,400,000	2,200,000	2,130,000	2,130,000	2,130,000
Total					
TOTAL Wheeling District	5,836,080	5,336,080	5,066,080	4,866,080	4,866,080

SOUTH OHIO RIVER

American Compressed Steel Co.	21,600	21,600	21,600	21,600	
Armco Steel Corp.					
Ashland	984,000	952,000	950,000	906,000	870,000
Middletown	2,493,000	2,249,000	1,815,000	1,715,000	1,697,000
Total	3,477,000	3,201,000	2,765,000	37,500	2,567,000
Connors Steel Div.	84,000	84,000	76,840	72,000	68,000
Detroit Steel Co.	1,500,000	1,500,000	1,290,000	1,290,000	1,290,000
Green River Steel Co.	183,190	183,190	179,400	196,000	241,920
Newport Steel Corp. (Merritt-Chapman & Scott)	608,000	608,000	708,500	708,500	708,500
TOTAL South Ohio District	5,873,790	5,597,790	5,043,340	4,905,100	4,875,420

ST. LOUIS

Granite City Steel Co.	1,200,000	1,200,000	1,060,000	1,290,000	1,290,000
Keystone Steel & Wire Co.	450,000	450,000	425,000	425,000	425,000
Laclede Steel Co.	600,000	500,000	500,000	500,000	500,000
Sheffield Steel Div. (Armco)	804,000	780,000	630,000	630,000	630,000
TOTAL St. Louis District	3,054,000	2,930,000	2,635,000	2,845,000	2,765,000

NORTHEAST

Allegheny Ludlum Steel Co.	77,000	77,000	77,000	77,000	77,000
American Steel & Wire Div.	287,000	287,000	287,000	287,000	287,000
Crucible Steel Co. of America					
Harrison	7,800	7,800	7,800	7,800	7,800
Syracuse	60,730	59,600	59,600	59,600	59,600
Total	68,530	67,400	67,400	67,400	67,400
Carpenter Steel Co. of N. E.*	84,000	303,200	303,200	188,260	188,260
Washburn Wire Co.	93,000	93,000	93,000	93,000	93,000
Wickwire Brothers, Inc.	32,250	30,300	21,380	20,800	19,830
TOTAL Northeast District	641,780	857,900	848,980	733,460	732,510

† Formerly "Wheeling."

* Formerly Northeastern Steel Corp., acquired by Carpenter Steel Corp.

cities By IRON AGE Districts

Source: American Iron and Steel Institute

WESTERN

DISTRICT—COMPANY	1958	1957	1956	1955	1954
Bethlehem Pacific Coast Steel Co.					
Los Angeles	478,000	478,000	452,000	402,000	402,000
San Francisco	276,000	276,000	252,000	252,000	252,000
Seattle	246,000	246,000	246,000	246,000	246,000
Total	1,000,000	1,000,000	950,000	900,000	900,000
Cabot Shops, Inc.	14,500	14,500	12,000	12,000	550,000
Cameron Iron Works	58,800	58,800	58,800	58,800	58,800
Colorado Fuel & Iron Corp.	1,800,000	1,800,000	1,485,000	1,485,000	1,485,000
Columbia-Geneva Steel Div.					
Geneva	2,262,000	2,077,000	1,937,000	1,879,000	1,879,000
Pittsburgh	380,000	380,000	380,000	391,000	391,000
Torrance	228,000	222,000	222,000	220,000	224,000
Total	2,870,000	2,679,000	2,539,000	2,490,000	2,494,000
Isaacson Iron Works	102,000	102,000	102,000	102,000	102,000
Judson Steel Co.	76,500	76,500	76,500	76,500	76,500
Kaiser Steel Corp.	1,536,000	1,536,000	1,536,000	1,536,000	1,536,000
R. G. Le Tourneau, Inc.	90,000	83,100	83,100	83,100	83,100
Lone Star Steel Co.	660,000	550,000	550,000	550,000	550,000
National Supply Co.	50,200	50,200	50,200	50,200	50,200
Northwest Steel Rolling Mills	53,000	48,600	46,000	42,000	42,000
Oregon Steel Mills	150,000	120,000	120,000	120,000	110,000
Pacific States Steel Corp.	216,000	216,000	181,770	181,770	181,770
Seidelhuber Steel Rolling Mill Co.					
Sheffield Steel Corp. (Armco)					
Sand Springs	120,000	120,000	60,000	54,000	54,000
Houston	1,284,000	1,200,000	1,050,000	1,050,000	1,050,000
Total	1,404,000	1,320,000	1,110,000	1,104,000	1,104,000
Southwest Steel Rolling Mills	45,000	45,000	45,000	45,000	45,000
Texas Steel Corp.	132,450	70,450	70,450	36,000	36,000
TOTAL Western District	10,258,450	9,782,150	9,027,820	8,884,370	8,883,290

BUFFALO

Allegheny Ludlum Steel Co.					
Dunkirk	33,000	33,000	33,000	33,000	33,000
Tonawanda	4,500	4,500	4,500	4,500	4,500
Total	37,500	37,500	37,500	37,500	37,500
Bethlehem Steel Co.	6,000,000	5,720,000	5,520,000	5,100,000	5,000,000
Erie Forge & Steel Co.	234,000	234,000	234,000	234,000	234,000
National Forge & Ordnance Co.	25,000	25,000	25,000	25,000	25,000
Republic Steel Corp.	882,000	882,000	882,000	882,000	882,000
Simonds Saw & Steel Co.	21,600	21,600	21,600	21,600	21,600
Colorado Fuel & Iron Corp.	295,000	295,000	295,000	252,000	252,000
TOTAL Buffalo District	7,495,100	7,215,100	7,015,100	6,552,100	6,452,100

DETROIT

Allegheny Ludlum Steel Corp.	3,000	3,000	3,000	3,000	3,000
Ford Motor Co.	1,898,600	1,877,400	1,877,420	1,755,000	1,755,000
Great Lakes Steel Co. (National Steel Corp.)	3,500,000	3,200,000	3,200,000	3,400,000	3,400,000
McLouth Steel Corp.	1,574,000	1,380,000	1,380,000	1,200,000	967,780
Jones & Laughlin Steel Corp.*	200,000	300,000	300,000	425,000	425,000
TOTAL Detroit District	7,175,600	6,760,400	6,760,420	6,783,000	6,550,780

CLEVELAND

Jones & Laughlin Steel Corp.	1,820,000	1,400,000	1,305,000	1,305,000	1,305,000
National Tube Div.	2,580,000	2,565,000	2,364,000	2,364,000	2,364,000
Republic Steel Corp.	3,360,000	2,860,000	2,572,000	2,572,000	2,572,000
TOTAL Cleveland District	7,760,000	6,825,000	6,241,000	6,241,000	6,241,000

* Formerly Rotary Electric Steel Corp.

SOUTHERN

DISTRICT—COMPANY	1958	1957	1956	1955	1954
Atlantic Steel Co.	400,000	400,000	450,000	300,000	300,000
Connors Steel Div. (H. K. Porter Co., Inc.)	115,000	115,000	115,000	67,500	67,500
Kilby Steel Co.	34,020	34,020	34,020	34,020	34,020
Knoxville Iron Co.	38,000	38,000	38,000	38,000	38,000
Mississippi Steel Corp.	45,000	45,000			
Newport News S. & D. Co.	15,000	12,000	12,000	12,000	12,000
Republic Steel Corp.	1,197,000	789,000	789,000	789,000	789,000
Roanoke Electric Steel Corp.	25,000	24,000			
Southern Electric Steel Co.	66,000	66,000			
Tennessee Coal & Iron Div.					
Ensley	1,770,000	1,770,000	1,770,000	1,770,000	1,745,000
Fairfield	2,227,000	2,227,000	2,227,000	2,227,000	2,086,000
Total	3,997,000	3,997,000	3,997,000	3,997,000	3,831,000
TOTAL Southern District	5,932,000	5,520,020	5,435,020	5,237,520	5,071,520

UPPER OHIO RIVER †

Ohio River Steel Div. (Louis Backman Co.)	136,080	136,080	136,080	136,080	136,080
Weirton Steel Co. (National Steel Corp.)	3,300,000	3,000,000	2,800,000	2,600,000	2,600,000
Wheeling Steel Corp.					
Benwood					
Steubenville	2,400,000	2,200,000	2,130,000	2,130,000	2,130,000
Total					
TOTAL Wheeling District	5,836,080	5,336,080	5,066,080	4,866,080	4,866,080

SOUTH OHIO RIVER

American Compressed Steel Co.	21,600	21,600	21,600	21,600	
Armco Steel Corp.					
Ashland	984,000	952,000	950,000	906,000	870,000
Middletown	2,493,000	2,249,000	1,815,000	1,715,000	1,697,000
Total	3,477,000	3,201,000	2,765,000	37,500	2,567,000
Connors Steel Div.	84,000	84,000	78,840	72,000	68,000
Detroit Steel Co.	1,500,800	1,500,000	1,290,000	1,290,000	1,290,000
Green River Steel Co.	183,190	183,190	179,400	198,000	241,920
Newport Steel Corp. (Merritt-Chapman & Scott)	608,000	608,000	708,500	708,500	708,500
TOTAL South Ohio District	5,873,790	5,597,790	5,043,340	4,905,100	4,875,420

ST. LOUIS

Granite City Steel Co.	1,200,000	1,200,000	1,080,000	1,290,000	1,290,000
Keystone Steel & Wire Co.	450,000	450,000	425,000	425,000	425,000
Laclede Steel Co.	600,000	600,000	600,000	500,000	500,000
Sheffield Steel Div. (Armco)	804,000	780,000	630,000	630,000	630,000
TOTAL St. Louis District	3,054,000	2,930,000	2,635,000	2,845,000	2,785,000

NORTHEAST

Allegheny Ludlum Steel Co.	77,000	77,000	77,000	77,000	77,000
American Steel & Wire Div.	287,000	287,000	287,000	287,000	287,000
Crucible Steel Co. of America					
Harrison	7,800	7,800	7,800	7,800	7,800
Syracuse	60,730	59,600	59,600	59,600	59,600
Total	68,530	67,400	67,400	67,400	67,400
Carpenter Steel Co. of N. E.*	84,000	303,200	303,200	188,280	188,280
Washburn Wire Co.	93,000	93,000	93,000	93,000	93,000
Wickwire Brothers, Inc.	32,250	30,300	21,380	20,800	19,830
TOTAL Northeast District	641,780	857,900	848,980	733,480	732,510

† Formerly "Wheeling."

* Formerly Northeastern Steel Corp., acquired by Carpenter Steel Corp.

Steel Capacity

▪ The steel industry spent a record $1.75 billion last year while adding 7.3 million ingot tons to its capacity. Spending this year will be cut to about $1 billion.

▪ But despite problems of financing and a business letdown comparable to that of 1954, the mills are expected to again increase capacity during the coming year.

▪ After establishing a record of $1.75 billion in 1957, steel industry spending for expansion and modernization will be cut drastically this year—to "about" $1 billion.

In the face of the slowest market since 1954, steel companies are pulling in their horns a bit until they see a definite turn for the better.

Record Capacity Gain — The industry's capacity on Jan. 1 stood at 140.7 million ingot tons, a record increase of 7.3 million tons or 5.4 pct over last year's 133.4 million tons. The 1957 capacity pickup compared with a gain of about five million tons in 1956.

American Iron and Steel Institute observes that 1957 spending brought the total capital investment by the steel industry since World War II to over $9.9 billion.

Ten-Year Gain — "As a result," comments AISI, "plants are more diversified and better equipped than ever before. In the past ten years, the annual steelmaking capacity of the United States has been increased by 46.5 million net tons."

During 1957, openhearth capacity rose by about 5,409,000 tons, compared with an increase of 4,600,000 tons the previous year. Electric furnace capacity moved up by 1,271,000 tons, a bigger increase than the 1956 rise of 783,000 tons.

Bessemer's Reverse Trend— Reversing a long-time trend, bessemer capacity rose by 603,000 tons last year, compared with a drop of 300,000 tons in 1956.

A breakdown by The IRON AGE steel producing districts shows that Philadelphia outstripped the rest of the country in tonnage gain during the year. It picked up 2,400,100 tons. Cleveland was in second place with a gain of 935,000 tons. Chicago was third with 741,000 tons. Mills in the Pittsburgh district added 677,510 tons.

Hot Metal Capacity Gains— The upper Ohio River district picked up 500,000 tons; the West 476,300 tons; Detroit 415,200 tons; the South 411,980 tons, and Buffalo 280,000 tons. The Northeast recorded a drop of 216,120 tons.

Blast furnace capacity rose 4.2 million tons to 91 million tons. Coke oven capacity declined slightly—from 73 million tons to 72.2 million tons.

Financing Problems—The industry this year may find it harder than ever before to come up with the dollars for capital spending, despite recent Government moves to make more money available at lower interest rates. Under present conditions, some steel companies may not try too hard, since there seems to be more than enough capacity to supply industry and Government steel needs.

But despite their problems, it's a foregone conclusion that the industry will again add to its capacity. Most of it probably will come about through increasing efficiency.

IRON AGE DISTRICT CHANGES AT A GLANCE

District	Pct of U. S. Capacity		Increase in Capacity		Pct of U. S. Increase
	1958	1957	Net Tons	Pct	
Chicago	19.24	19.74	741,000	2.8	10.1
Pittsburgh	17.35	17.79	677,510	2.8	9.3
Philadelphia	14.17	13.15	2,400,100	13.7	32.9
Valley	10.84	11.24	262,400	1.7	3.6
West	7.28	7.33	476,300	4.8	6.5
Cleveland	5.51	5.11	935,000	13.6	12.8
Buffalo	5.32	5.41	280,000	3.8	3.8
Detroit	5.09	5.07	415,200	6.1	5.7
South	4.21	4.14	411,980	7.4	5.6
South Ohio River	4.17	4.19	276,000	4.9	3.7
Upper Ohio River	4.14	4.00	500,000	9.3	6.8
St. Louis	2.16	2.19	124,000	4.2	1.7
Northeast	0.45	0.64	−216,120	−2.5	−2.9
Total	100.00	100.00	7,283,370	5.4	100.00

Official Steel Industry Capacities

Source: American Iron and Steel Institute

THE IRON AGE DISTRICTS STEEL CAPACITY

In Thousands of Net Tons—Source: American Iron and Steel Institute—Compilations: The Iron Age

District	1958		1957		1956		1955		1954	
	Net Tons	Pct of Total	Net Tons	Pct of Total	Net Tons	Pct of Total	Net Tons	Pct of Total	Net Tons	Pct of Total
Chicago	27,081	19.24	26,341	19.74	25,249	19.67	25,008	19.87	24,587	19.78
Pittsburgh	24,422	17.35	23,744	17.79	23,374	18.21	22,987	18.27	23,016	18.15
Philadelphia	19,944	14.17	17,544	13.15	17,308	13.48	16,859	13.40	16,386	13.18
Valley	15,268	10.84	15,006	11.24	14,372	11.20	13,939	11.08	13,896	11.18
Western	10,258	7.28	9,782	7.33	9,028	7.03	8,884	7.06	8,883	7.14
Cleveland	7,760	5.51	6,825	5.11	6,241	4.86	6,241	4.96	6,241	5.02
Buffalo	7,495	5.32	7,215	5.41	7,015	5.46	6,552	5.21	6,452	5.19
Detroit	7,175	5.09	6,760	5.07	6,760	5.27	6,783	5.39	6,551	5.27
Southern	5,932	4.21	5,520	4.14	5,423	4.22	5,226	4.15	5,060	4.07
South Ohio River	5,873	4.17	5,598	4.19	5,043	3.93	4,905	3.90	4,875	3.92
Upper Ohio River	5,836	4.14	5,336	4.00	5,066	3.95	4,866	3.87	4,866	3.91
St. Louis	3,054	2.16	2,930	2.19	2,635	2.05	2,845	2.26	2,785	2.24
Northeast	641	0.45	857	0.64	849	0.66	733	0.58	733	0.59
Total	140,742	100.00	133,459	100.00	128,363	100.00	125,828	100.00	124,330	100.00

BLAST FURNACE CAPACITIES BY COMPANIES AND GEOGRAPHIC LOC

Annual Capacity of Blast Furnaces as of January 1, 1958

	No. of stacks	Total annual capacity (N. T.)
Companies:		
Alan Wood Steel Company	2	544,300
Armco Steel Corporation	6	2,229,000
Sheffield Division	1	500,000
TOTAL	7	2,729,000
Barnum Steel Corporation:		
Phoenix Iron and Steel Co.	1	260,000
Berkman Company, Louis	1	136,800
Bethlehem Steel Company	34	(a) 14,544,000
Colorado Fuel and Iron Corporation	7	1,396,290
Crucible Steel Company of America	3	995,000
Detroit Steel Corporation	2	768,780
Eastern Gas and Fuel Associates	1	195,000
Ford Motor Company	3	1,090,730
Granite City Steel Company	2	675,000
Inland Steel Company	8	3,062,000
Interlake Iron Corporation	7	1,630,000
International Harvester Company	3	808,000
Jackson Iron & Steel Company	1	95,000
Jones & Laughlin Steel Corporation	13	5,061,800
Kaiser Steel Corporation	4	1,912,100
Levino & Company, E. J.	3	(b) 174,660
Lone Star Steel Company	1	385,000
McLouth Steel Corporation	1	483,500
Merritt-Chapman & Scott Corp.:		
Tennessee Products & Chemical Corp.	3	217,740
National Steel Corporation:		
Great Lakes Steel Corporation	4	2,130,000
Hanna Furnace Corporation	4	850,000
Weirton Steel Company Division	4	2,300,000
TOTAL	12	5,270,000
New Jersey Zinc Company	3	(c) 112,000
Pittsburgh Coke & Chemical Company	3	836,500
Pittsburgh Steel Company	3	950,000
Republic Steel Corporation	23	7,902,000
Sharon Steel Corporation	3	824,600
Shenango Furnace Company	2	445,450
Tonawanda Iron Division, American Radiator & Stand. Sanitary Corp.	1	165,000
United States Pipe & Foundry Co.	4	491,710
United States Steel Corporation:		
United States Steel Corp. (Central Operations)	54	(d) 20,199,900
American Steel & Wire Division	6	1,693,000
Columbia-Geneva Steel Division	5	1,804,200

(a) Includes 240,000 tons ferroalloys capacity.
(b) Ferromanganese only.
(c) Spiegeleisen only.
(d) Includes 302,500 tons ferroalloys capacity.

Capacity of Blast Furnaces — January 1, 1958 (*Continued*)

	No. of stacks	Total annual capacity (N. T.)
Companies (Continued):		
National Tube Division	9	3,290,000
Tennessee Coal & Iron Division	9	(e) 3,317,400
TOTAL	83	(f) 39,174,500
Wheeling Steel Corporation	6	1,912,000
Woodward Iron Company	4	772,630
Youngstown Sheet & Tube Company	13	4,140,000
GRAND TOTAL	365	(g) 91,000,110
Plant Location and Operating Company:		
Alabama (Southern District)		
Birmingham		
Republic Steel Corporation	2	402,000
United States Pipe & Foundry Co.	1	281,330
Ensley		
Tennessee Coal & Iron Division	6	(e) 1,829,000
Fairfield		
Tennessee Coal & Iron Division	3	1,368,400
Gadsden		
Republic Steel Corporation	2	525,000
North Birmingham		
United States Pipe & Foundry Co.	1	210,480
Woodward		
Woodward Iron Company	4	772,630
TOTAL	21	(e) 5,408,740
California (Western District)		
Fontana		
Kaiser Steel Corporation	4	1,912,100
Colorado (Western District)		
Pueblo		
Colorado Fuel and Iron Corporation	4	882,840
Illinois (Chicago District)		
Chicago		
Interlake Iron Corporation	2	567,000
International Harvester Company	3	808,000
Republic Steel Corporation	1	560,000
United States Steel Corp. (Central Operations)	11	4,196,700
Youngstown Sheet and Tube Company	3	684,000
Granite City		
Granite City Steel Co.	2	675,000
TOTAL	22	7,519,700

(e) Includes 39,000 tons ferroalloys capacity.
(f) Includes 341,500 tons ferroalloys capacity.
(g) Includes 868,160 tons ferroalloys capacity.

STEEL CAPACITY BY COMPANIES AND TYPES

Annual Steel Capacity (Ingots and Steel for Castings) as of January 1, 1958
(Capacities of Foundries Which Normally Produce Steel Only for Castings are not Included)

	OPEN HEARTH		BESSEMER AND OXYGEN CONV.		ELECTRIC AND CRUCIBLE		Total annual capacity (N. T.)
	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	
Kinds:							
Open hearth—basic	892	121,502,400					121,502,400
Open hearth—acid	34	819,430					819,430
Oxygen Converter			5	1,081,000			1,081,000
Bessemer			33	4,027,000			4,027,000
Electric					275	13,312,700	13,312,700
Crucible					1	40	40
TOTAL	926	122,321,830 (d)	38	5,108,000	276	13,312,740	140,742,570
Companies:							
Acme-Newport Steel Co.	7	325,000	....	.....	3	283,000	608,000
Alan Wood Steel Co.	9	800,000					800,000
Alco Products, Inc.	3	102,300			1	2,160	104,460
Allegheny Ludlum Steel Corporation	5	312,000			30	552,200	864,200
American Compressed Steel Corp.					1	21,600	21,600
Armco Steel Corporation	28	3,567,000			9	469,000	4,136,000
Sheffield Division	13	1,440,000			5	768,000	2,208,000
TOTAL	41	5,107,000			14	1,237,000	6,344,000
Atlantic Steel Company	3	124,000			2	276,000	400,000
Babcock & Wilcox Company					4	229,450	229,450
Baldwin-Lima-Hamilton Corp.	5	169,920			(e) 2	18,790	188,710
Barium Steel Corporation:							
Industrial Forge & Steel Co.	3	84,000					84,000
Phoenix Iron & Steel Co.	11	806,760			1	40,000	846,760
TOTAL	13	890,760			1	40,000	930,760
Berkman Company, Louis Ohio River Steel Div.	4	136,080					136,080
Bethlehem Steel Corp.							
Bethlehem Steel Co.	132	21,434,000	3	336,000	6	230,000	22,000,000
Bethlehem Pacific Coast Steel Corp.	5	276,000			5	724,000	1,000,000
TOTAL	137	21,710,000	3	336,000	11	954,000	23,000,000
Borg-Warner Corporation:							
Ingersoll Steel Div.					4	64,000	64,000
Ingersoll Products Div.					2	100,000	100,000
TOTAL					6	164,000	164,000
Braeburn Alloy Steel Corp.					2	20,730	20,730
Byers Company, A. M.					2	90,000	90,000
Cabot Shops, Inc.					1	14,500	14,500
Cameron Iron Works, Inc.					3	58,800	58,800
Carpenter Steel Company					6	88,600	88,600
Carpenter Steel of N. E.					2	84,000	84,000
TOTAL					8	170,600	170,600
Colorado Fuel & Iron Corp.	27	2,801,500	..	.....	.....	.....	2,801,500
Roebling's Sons Corp., J. A.	9	235,000	....	.....	.....	.....	235,000
TOTAL	36	2,836,500					2,836,500

Steel Capacity (Ingots and Steel for Castings) January 1, 1958 (*Continued*)

	OPEN HEARTH		BESSEMER AND OXYGEN CONV.		ELECTRIC AND CRUCIBLE		Total annual capacity (N. T.)
	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	
Companies (Continued):							
Columbia Tool Steel Co.					2	6,600	6,600
Continental Steel Corp.	5	420,000					420,000
Copperweld Steel Co.					7	660,000	660,000
Crucible Steel Company of America	9	1,044,000			19	380,530	1,424,530
Detroit Steel Corp.	15	1,500,000					1,500,000
Eastern Stainless Steel Corp.					5	80,000	80,000
Edgewater Steel Co.	3	117,600					117,600
Empire Steel Corporation	7	500,000					500,000
Erie Forge & Steel Corp.	5	234,000					234,000
Finkl & Sons Co., A.					3	33,600	33,600
Firth Sterling Inc.					3	20,040	20,040
Ford Motor Company	10	1,677,150			5	221,450	1,898,600
Granite City Steel Co.	7	1,200,000					1,200,000
Harrisburg Steel Co., Div. of Harsco Corp.	3	100,750					100,750
Heppenstall Company	3	50,470			1	5,080	55,550
Midvale-Heppenstall Co.	3	100,800			5	56,900	157,700
TOTAL	5	151,270			6	61,980	213,250
Inland Steel Company	43	5,800,000					5,800,000
International Harvester Company	11	1,200,000					1,200,000
Isaacson Iron Works					1	102,000	102,000
Jessop Steel Company					4	35,740	35,740
Green River Steel Corp.					2	183,190	183,190
TOTAL					6	218,930	218,930
Jones & Laughlin Steel Corporation	37	6,086,000	(g) 5	792,000	9	622,000	7,500,000
Joslyn Mfg. & Supply Co.					3	37,500	37,500
Judson Steel Corporation	3	76,500					76,500
Kaiser Steel Corp.	9	1,536,000					1,536,000
Keystone Steel & Wire Co.	4	450,000					450,000
Kilby Steel Company					1	34,020	34,020
Knoxville Iron Company					2	38,000	38,000
Laclede Steel Company	4	600,000					600,000
Latrobe Steel Company					5	34,000	34,000
La Tourneau, Inc., R. G.					3	90,000	90,000
Lone Star Steel Co.	4	660,000					660,000
Lukens Steel Company	13	750,000					750,000
McLouth Steel Corporation			(f) 3	589,000	6	985,000	1,574,000
Merritt-Chapman & Scott Corp.:							
Milton Steel Div.					3	90,000	90,000
Mesta Machine Company	8	151,000			1	20,000	171,000
Mississippi Steel Corp.					1	45,000	45,000
National Forge & Ordnance Company					3	25,000	25,000
National Steel Corp.:							
Great Lakes Steel Corp.	17	3,500,000	(h) 2				3,500,000
Weirton Steel Co. Div.	14	3,300,000	(h) 2				3,300,000
TOTAL	31	6,800,000	(h) 4				6,800,000

LOCATION

Capacity of Blast Furnaces — January 1, 1958 (*Continued*)

	No. of stacks	Total annual capacity (N. T.)
Indiana (Chicago District)		
Chicago		
Inland Steel Company	8	3,061,000
Youngstown Sheet and Tube Company	3	1,396,000
United States Steel Corp. (Central Operations)	12	4,782,600
TOTAL	23	9,140,600
Kentucky (Pittsburgh - Youngstown District)		
Ashland		
Armco Steel Corporation	3	939,000
Maryland (Eastern District)		
Crows Point		
Bethlehem Steel Company	10	5,316,000
Massachusetts (Eastern District)		
Everett		
Eastern Gas and Fuel Associates	1	195,000
Michigan (Cleveland - Detroit District)		
Dearborn		
Ford Motor Company	3	1,090,730
River Rouge		
Great Lakes Steel Corporation	4	2,130,000
Trenton		
McLouth Steel Corporation	1	483,500
TOTAL	8	3,694,230
Minnesota (Chicago District)		
Duluth		
American Steel & Wire Division	2	491,000
Interlake Iron Corporation	1	146,000
TOTAL	3	637,000
New York (Eastern District)		
Buffalo		
Donner Furnace Corporation	4	850,000
Republic Steel Corporation	2	663,000
Lackawanna		
Bethlehem Steel Company	7	3,444,000
North Tonawanda		
Tonawanda Iron Division	1	165,000
Tonawanda		
Colorado Fuel & Iron Corporation	2	361,350
Utica		
Republic Steel Corporation	1	263,000
TOTAL	17	5,766,350

Capacity of Blast Furnaces — January 1, 1958 (*Continued*)

	No. of stacks	Total annual capacity (N. T.)
Ohio (Pittsburgh - Youngstown District)		
Campbell		
Youngstown Sheet and Tube Company	4	1,452,000
Canton		
Republic Steel Corporation	1	266,000
Hubbard		
Youngstown Sheet and Tube Company	1	204,000
Jackson		
Interlake Iron Corporation	1	75,000
Jackson Iron & Steel Company	1	95,000
Lowellville		
Sharon Steel Corporation	1	148,000
Martins Ferry		
Louis Berkman Company	1	136,800
Massillon		
Republic Steel Corporation	1	266,000
Middletown		
Armco Steel Corporation	1	660,000
New Miami		
Armco Steel Corporation	2	630,000
Portsmouth		
Detroit Steel Corporation	2	768,700
Steubenville		
Wheeling Steel Corporation	3	1,066,000
Struthers		
Pittsburgh Coke & Chemical Company	1	182,500
Warren		
Republic Steel Corporation	1	580,000
Youngstown		
Republic Steel Corporation	5	1,773,000
United States Steel Corp. (Central Operations)	6	2,101,000
Youngstown Sheet and Tube Company	2	594,000
SubTotal (Pitts. - Youngs. Dist.)	36	11,496,000
Ohio (Cleveland - Detroit District)		
Cleveland		
American Steel & Wire Division	3	752,000
Jones & Laughlin Steel Corporation	2	866,000
Republic Steel Corporation	6	2,586,000
Lorain		
National Tube Division	5	2,010,000
Toledo		
Interlake Iron Corporation	2	551,000
SubTotal (Clev. - Det. Dist.)	17	6,765,000
TOTAL—Ohio	53	18,263,000
Pennsylvania (Pittsburgh - Youngstown District)		
Aliquippa		
Jones & Laughlin Steel Corporation	5	2,090,000
Braddock		
United States Steel Corp. (Central Operations)	7	2,730,300

Capacity of Blast Furnaces — January 1, 1958 (*Continu*

	No. of stacks	To annual capa (N.
Pennsylvania (Pittsburgh - Youngstown District) (Continued):		
Clairton		
United States Steel Corp. (Central Operations)	3	
Donora		
American Steel & Wire Division	2	
Duquesne		
United States Steel Corp. (Central Operations)	6	(a) 1,
Farrell		
Sharon Steel Corporation	2	
McKeesport		
National Tube Division	4	1,
Midland		
Crucible Steel Company of America	3	
Monessen		
Pittsburgh Steel Company	3	
Neville Island		
Pittsburgh Coke & Chemical Company	2	
Pittsburgh		
Jones & Laughlin Steel Corporation	6	2,
Rankin		
United States Steel Corp. (Central Operations)	6	2,
Sharpsville		
Shenango Furnace Company	2	
SubTotal (Pitts. - Youngs. Dist.)	51	16,
Pennsylvania (Eastern District)		
Bethlehem		
Bethlehem Steel Company	7	2,
Birdsboro		
Colorado Fuel and Iron Corporation	1	
Chester		
Barium Steel Corp.:		
Phoenix Iron and Steel Co.	1	
Erie		
Interlake Iron Corporation	1	
Fairless Hills		
United States Steel Corp. (Central Operations)	3	1,
Johnstown		
Bethlehem Steel Company	7	(b) 2,
Palmerton		
New Jersey Zinc Company	2	(c)
Sheridan		
Lavino and Company, E. J.	1	(d)
Steelton		
Bethlehem Steel Company	3	1,
Swedeland		
Alan Wood Steel Company	2	
SubTotal (Eastern Dist.)	28	8,
TOTAL—Pennsylvania	79	(e) 25,

(a) Includes 302,500 tons ferroalloys capacity.
(b) Includes 240,000 tons ferroalloys capacity.
(c) Spiegeleisen only.
(d) Ferromanganese only.
(e) Includes 701,160 tons ferroalloys capacity

STEEL CAPACITY BY COMPANIES AND TYPES

Annual Steel Capacity (Ingots and Steel for Castings) as of January 1, 1958
(Capacities of Foundries Which Normally Produce Steel Only for Castings are not Included)

	OPEN HEARTH		BESSEMER AND OXYGEN CONV.		ELECTRIC AND CRUCIBLE		Total annual capacity (N. T.)
	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	
Kinds:							
Open hearth—basic	892	121,502,400					121,502,400
Open hearth—acid	34	819,430					819,430
Oxygen Converter			5	1,081,000			1,081,000
Bessemer			33	4,027,000			4,027,000
Electric					275	13,312,700	13,312,700
Crucible					1	40	40
TOTAL	926	122,321,830	(d) 38	5,108,000	276	13,312,740	140,742,570
Companies:							
Acme-Newport Steel Co.	7	325,000			3	283,000	608,000
Alan Wood Steel Co.	9	880,000					880,000
Alco Products, Inc.	3	102,300			1	2,160	104,460
Allegheny Ludlum Steel Corporation	5	312,000			30	552,200	864,200
American Compressed Steel Corp.					1	21,600	21,600
Armco Steel Corporation	38	3,667,000			9	469,000	4,136,000
Sheffield Division	13	1,440,000			5	768,000	2,208,000
TOTAL	41	5,107,000			14	1,237,000	6,344,000
Atlantic Steel Company	3	124,000			2	276,000	400,000
Babcock & Wilcox Company					4	229,450	229,450
Baldwin-Lima-Hamilton Corp.	5	189,920			(e) 2	18,790	108,710
Barium Steel Corporation:							
Industrial Forge & Steel Co.	2	84,000					84,000
Phoenix Iron & Steel Co.	11	806,760			1	40,000	846,760
TOTAL	13	890,760			1	40,000	930,760
Berkman Company, Louis							
Ohio River Steel Div.	4	136,080					136,080
Bethlehem Steel Corp.:							
Bethlehem Steel Co.	132	21,434,000	3	336,000	6	230,000	22,000,000
Bethlehem Pacific Coast Steel Corp.	5	276,000			5	724,000	1,000,000
TOTAL	137	21,710,000	3	336,000	11	954,000	23,000,000
Borg-Warner Corporation:							
Ingersoll Steel Div.					4	64,000	64,000
Ingersoll Products Div.					2	100,000	100,000
TOTAL					6	164,000	164,000
Braeburn Alloy Steel Corp.					2	20,730	20,730
Byers Company, A. M.					2	90,000	90,000
Cabot Shops, Inc.					1	14,500	14,500
Cameron Iron Works, Inc.					2	58,800	58,800
Carpenter Steel Company					6	86,600	86,600
Carpenter Steel of N. E.					2	84,000	84,000
TOTAL					8	170,600	170,600
Colorado Fuel & Iron Corp.	27	2,601,500					2,601,500
Wheeling's Sons Corp., J. A.	9	235,000					235,000
TOTAL	36	2,836,500					2,836,500

Steel Capacity (Ingots and Steel for Castings) January 1, 1958 (*Continued*)

	OPEN HEARTH		BESSEMER AND OXYGEN CONV.		ELECTRIC AND CRUCIBLE		Total annual capacity (N. T.)
	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	
Companies (Continued):							
Columbia Tool Steel Co.					2	6,600	6,600
Continental Steel Corp.	5	420,000					420,000
Copperweld Steel Co.					7	660,000	660,000
Crucible Steel Company of America	9	1,044,000			19	380,530	1,424,530
Detroit Steel Corp.	15	1,500,000					1,500,000
Eastern Stainless Steel Corp.					5	80,000	80,000
Edgewater Steel Co.	3	117,600					117,600
Empire Steel Corporation	7	500,000					500,000
Erie Forge & Steel Corp.	5	234,000					234,000
Finkl & Sons Co., A.					2	33,600	33,600
Firth Sterling Inc.					3	20,040	20,040
Ford Motor Company	10	1,677,150			5	221,450	1,898,600
Granite City Steel Co.	7	1,200,000					1,200,000
Harrisburg Steel Co., Div. of Harsco Corp.	3	100,750					100,750
Heppenstall Company	2	50,470			1	5,080	55,550
Midvale-Heppenstall Co.	3	100,800			5	56,900	157,700
TOTAL	5	151,270			6	61,980	213,250
Inland Steel Company	43	5,800,000					5,800,000
International Harvester Company	11	1,200,000					1,200,000
Isaacson Iron Works					2	102,000	102,000
Jessop Steel Company					4	35,740	35,740
Green River Steel Corp.					2	183,190	183,190
TOTAL					6	218,930	218,930
Jones & Laughlin Steel Corporation	37	6,086,000	(g) 5	792,000	9	622,000	7,500,000
Joslyn Mfg. & Supply Co.					3	37,580	37,580
Judson Steel Corporation	5	76,500					76,500
Kaiser Steel Corp.	9	1,536,000					1,536,000
Keystone Steel & Wire Co.	4	450,000					450,000
Kilby Steel Company					1	34,020	34,020
Knoxville Iron Company					2	38,000	38,000
Laclede Steel Company	4	600,000					600,000
Latrobe Steel Company					5	34,000	34,000
Le Tourneau, Inc., R. G.					2	90,000	90,000
Lone Star Steel Co.	4	660,000					660,000
Lukens Steel Company	12	750,000					750,000
McLouth Steel Corporation			(f) 3	589,000	8	985,000	1,574,000
Merritt-Chapman & Scott Corp.:							
Milton Steel Div.					3	90,000	90,000
Mesta Machine Company	8	151,000			1	20,000	171,000
Mississippi Steel Corp.					1	45,000	45,000
National Forge & Ordnance Company					3	25,000	25,000
National Steel Corp.:							
Great Lakes Steel Corp.	17	3,500,000	(h) 1				3,500,000
Weirton Steel Co. Div.	14	3,300,000	(h) 3				3,300,000
TOTAL	31	6,800,000	(h) 4				6,800,000

CATION

Blast Furnaces — January 1, 1958 (*Continued*)

	No. of stacks	Total annual capacity (N. T.)
(Chicago District)		
Company	3	3,062,000
Sheet and Tube Company	3	1,296,000
Steel Corp. (Central	13	4,782,600
TOTAL	23	9,140,600
Kentucky - Youngstown District)		
Corporation	2	939,000
and (Eastern District)		
nt Steel Company	10	5,316,000
ussells (Eastern District)		
and Fuel Associates	1	195,000
Cleveland - Detroit District)		
Company	3	1,090,730
Steel Corporation	4	2,120,000
eel Corporation	1	483,500
TOTAL	8	3,694,230
ago (Chicago District)		
eel & Wire Division	2	491,000
on Corporation	1	146,000
TOTAL	3	637,000
York (Eastern District)		
nce Corporation	4	850,000
eel Corporation	3	683,000
Steel Company	7	3,444,000
wanda Iron Division	1	165,000
el & Iron Corporation	2	361,250
eel Corporation	1	263,000
TOTAL	17	5,766,250

Capacity of Blast Furnaces — January 1, 1958 (*Continued*)

	No. of stacks	Total annual capacity (N. T.)
Ohio (Pittsburgh - Youngstown District)		
Campbell		
Youngstown Sheet and Tube Company	4	1,452,000
Canton		
Republic Steel Corporation	1	266,000
Hubbard		
Youngstown Sheet and Tube Company	1	204,000
Jackson		
Interlake Iron Corporation	1	75,000
Jackson Iron & Steel Company	1	93,600
Lowellville		
Sharon Steel Corporation	1	148,800
Martins Ferry		
Louis Berkman Company	1	118,800
Massillon		
Republic Steel Corporation	1	266,900
Middletown		
Armco Steel Corporation	1	660,000
New Miami		
Armco Steel Corporation	2	630,000
Portsmouth		
Detroit Steel Corporation	2	768,000
Steubenville		
Wheeling Steel Corporation	5	1,068,000
Struthers		
Pittsburgh Coke & Chemical Company	1	182,500
Warren		
Republic Steel Corporation	1	566,000
Youngstown		
Republic Steel Corporation	5	1,773,000
United States Steel Corp. (Central Operations)	6	2,101,400
Youngstown Sheet and Tube Company	2	804,000
SubTotal (Pitts. - Youngs. Dist.)	36	11,498,000
Ohio (Cleveland - Detroit District)		
Cleveland		
American Steel & Wire Division	2	752,000
Jones & Laughlin Steel Corporation	2	866,000
Republic Steel Corporation	6	2,588,000
Lorain		
National Tube Division	5	2,010,000
Toledo		
Interlake Iron Corporation	2	551,000
SubTotal (Clev. - Det. Dist.)	17	6,765,000
TOTAL—Ohio	53	18,263,000
Pennsylvania (Pittsburgh - Youngstown District)		
Aliquippa		
Jones & Laughlin Steel Corporation	5	2,090,000
Braddock		
United States Steel Corp. (Central Operations)	7	2,730,300

Capacity of Blast Furnaces — January 1, 1958 (*Continued*)

	No. of stacks	Total annual capacity (N. T.)
Pennsylvania (Pittsburgh - Youngstown District) (Continued):		
Clairton		
United States Steel Corp. (Central Operations)	3	772,600
Donora		
American Steel & Wire Division	2	450,000
Duquesne		
United States Steel Corp. (Central Operations)	6 (a)	1,402,900
Farrell		
Sharon Steel Corporation	2	676,000
McKeesport		
National Tube Division	4	1,180,000
Midland		
Crucible Steel Company of America	3	895,000
Monessen		
Pittsburgh Steel Company	3	950,000
Neville Island		
Pittsburgh Coke & Chemical Company	2	654,000
Pittsburgh		
Jones & Laughlin Steel Corporation	6	2,105,000
Rankin		
United States Steel Corp. (Central Operations)	6	2,305,500
Sharpsville		
Shenango Furnace Company	2	445,450
SubTotal (Pitts. - Youngs. Dist.)	51	16,756,650
Pennsylvania (Eastern District)		
Bethlehem		
Bethlehem Steel Company	7	2,718,000
Bridgeport		
Colorado Fuel and Iron Corporation	1	151,300
Chester		
Barium Steel Corp.:		
Phoenix Iron and Steel Co.	1	900,000
Erie		
Interlake Iron Corporation	1	271,000
Fairless Hills		
United States Steel Corp. (Central Operations)	3	1,878,000
Johnstown		
Bethlehem Steel Company	7 (b)	2,946,000
Palmerton		
New Jersey Zinc Company	2 (c)	112,000
Sheridan		
Lavino and Company, E. J.	1 (d)	46,660
Steelton		
Bethlehem Steel Company	3	1,020,000
Swedeland		
Alan Wood Steel Company	1	544,200
SubTotal (Eastern Dist.)	28	8,987,060
TOTAL—Pennsylvania	79 (e)	25,743,710

(a) Includes 302,500 tons ferroalloys capacity.
(b) Includes 240,000 tons ferroalloys capacity.
(c) Spiegeleisen only.
(d) Ferromanganese only.
(e) Includes 701,160 tons ferroalloys capacity

Steel Capacity (Ingots and Steel for Castings) January 1, 1958 (*Continued*)

	OPEN HEARTH		BESSEMER AND OXYGEN CONV.		ELECTRIC AND CRUCIBLE		Total annual capacity (Net T.)
	No.	Annual capacity (Net T.)	No.	Annual capacity (Net T.)	No.	Annual capacity (Net T.)	
Companies (*Continued*):							
National Supply Co.	....	.....	....	.....	3	50,200	50,200
Newport News Shipbuilding & Dry Dock Co.	....	.....	....	.....	2	15,000	15,000
Northwest Steel Rolling Mills, Inc.	....	.....	....	.....	2	53,000	53,000
Northwestern Steel & Wire Co.	....	.....	....	.....	5	825,000	825,000
Oregon Steel Mills	....	.....	....	.....	3	150,000	150,000
Pacific States Steel Corp.	3	216,000	....	.....	....	.....	216,000
Pittsburgh Steel Co.	13	1,416,000	....	.....	....	.....	1,416,000
Porter Co., Inc., H. K.:							
Connors Steel Div.	....	.....	....	.....	4	199,000	199,000
Vulcan Crucible St. Div.	....	.....	....	.....	2	9,500	9,500
TOTAL	....	.....	....	.....	6	208,500	208,500
Republic Steel Corp.	80	9,340,000	2	539,000	23	2,373,000	12,242,000
Roanoke Electric Steel Corp.	....	.....	....	.....	1	25,000	25,000
Sharon Steel Corp.	17	1,826,000	....	.....	3	163,000	1,989,000
Sotomda Saw & Steel Co.	....	.....	....	.....	3	21,500	21,500
Southern Electric Steel Co.	....	.....	....	.....	2	66,000	66,000
Southwest Steel Rolling Mills	....	.....	....	.....	1	45,000	45,000
Texas Steel Company	....	.....	....	.....	4	132,450	132,450
Timken Roller Bearing Company	....	.....	....	.....	9	700,000	700,000
Union Electric Steel Corp.	....	.....	....	.....	2	25,000	25,000
United States Steel Corp.:							
United States Steel Corp. (Central Operations)	177	25,373,000	(c) 8	1,284,000	9	387,000	27,044,000
American Steel & Wire Div.	26	2,275,000	....	.....	....	.....	2,275,000
Columbia-Geneva Steel Div.	19	2,870,000	....	.....	....	.....	2,870,000
National Tube Div.	15	3,078,000	6	948,000	....	.....	4,026,000
Tennessee Coal & Iron Div.	23	3,997,000	(b) 3	.....	....	.....	3,997,000
TOTAL	260	37,593,000	17	2,232,000	9	387,000	40,212,000
Universal-Cyclops Steel Corporation	....	.....	....	.....	5	70,160	70,160
Vanadium-Alloys Steel Co.	....	.....	....	.....	4	12,000	12,000
Colonial Steel Co.	....	.....	....	.....	2	30,000	30,000
TOTAL	....	.....	....	.....	6	42,000	42,000
Washburn Wire Co.	4	93,000	....	.....	....	.....	93,000
Wheeling Steel Corp.	11	1,830,000	2	570,000	....	.....	2,400,000
Wickwire Brothers, Inc.	....	.....	....	.....	1	32,250	32,250
Youngstown Sheet and Tube Company	41	6,440,000	3	60,000	....	.....	6,500,000
GRAND TOTAL	936	122,321,830	(d) 38	5,108,000	(e)276	13,313,740	140,742,570

Capacity of Blast Furnaces — January 1, 1958 (*Continued*)

	No. of stacks	Total annual capacity (Net T.)
Tennessee (Southern District)		
Lyles-Wrigley		
Merritt-Chapman & Scott Corp.:		
Tennessee Products & Chemical Corp.	1	36,300
Rockwood		
Merritt-Chapman & Scott Corp.:		
Tennessee Products & Chemical Corp.	2	181,440
TOTAL	3	217,740
Texas (Southern District)		
Houston		
Sheffield Division	1	500,000
Lone Star		
Lone Star Steel Company	1	385,000
TOTAL	2	885,000
Utah (Western District)		
Geneva		
Columbia-Geneva Steel Division	3	1,321,500
Ironton		
Columbia-Geneva Steel Division	2	482,700
TOTAL	5	1,804,200
Virginia (Southern District)		
Lynchburg		
Lavino and Company, E. J.	2 (a)	128,000
West Virginia (Pittsburgh - Youngstown District)		
Benwood		
Wheeling Steel Corporation	1	246,000
Weirton		
Weirton Steel Company Division	4	2,300,900
TOTAL	5	2,546,900
DISTRIBUTION BY DISTRICTS:		
Eastern	56	(b) 20,264,310
Pittsburgh-Youngstown	95	(c) 31,739,650
Cleveland-Detroit	25	15,458,230
Chicago	48	17,297,300
Southern	28	(d) 6,639,480
Western	13	4,600,140
TOTAL	265	(e) 91,000,110

(a) Ferromanganese only.
(b) Includes 398,660 tons ferroalloys capacity.
(c) Includes 302,500 tons ferroalloys capacity.
(d) Includes 167,000 tons ferroalloys capacity.
(e) Includes 868,160 tons ferroalloys capacity.

COKE CAPACITY

Annual Coke Capacity as of January 1, 1958
(Coke Capacity of Iron and Steel Industry)

	BEEHIVE		OTHER		Total annual capacity (N. T.)
	No. of ovens	Annual capacity (N. T.)	No. of ovens	Annual capacity (N. T.)	
Companies:					
Alan Wood Steel Company	....	.....	151	600,000	600,000
Armco Steel Corporation	....	.....	186	1,075,000	1,075,000
Sheffield Division	....	.....	62	394,000	394,000
TOTAL	....	.....	248	1,469,000	1,469,000
Bethlehem Steel Company	....	.....	2,153	11,428,000	11,428,000
Colorado Fuel and Iron Corporation	....	.....	266	958,000	958,000
Crucible Steel Company of America	....	.....	213	831,600	831,600
Detroit Steel Corporation	....	.....	108	550,000	550,000
Eastern Gas and Fuel Associates	....	.....	108	664,000	664,000
Ford Motor Company	....	.....	220	1,435,160	1,435,160
Granite City Steel Company	....	.....	76	430,000	430,000
Inland Steel Company	....	.....	443	2,395,800	2,395,800
Interlake Iron Corporation	....	.....	370	1,653,000	1,653,000
International Harvester Company	....	.....	155	750,000	750,000
Jones & Laughlin Steel Corporation	....	.....	831	3,815,000	3,815,000
Kaiser Steel Corporation	297	100,000	315	1,502,000	1,602,000
Lone Star Steel Company	....	.....	78	438,000	438,000
Merritt-Chapman & Scott Corp.:					
Tennessee Products & Chemical Corp.	....	.....	44	251,500	251,500
National Steel Corporation:					
Great Lakes Steel Corporation	....	.....	294	2,000,000	2,000,000
Hanna Furnace Corporation	....	.....	126	*585,000	*585,000
Weirton Steel Company Division	....	.....	294	1,900,000	1,900,000
TOTAL	....	.....	714	4,485,000	4,485,000
Pittsburgh Coke & Chemical Company	....	.....	140	750,000	750,000
Pittsburgh Steel Company	320	228,000	93	600,000	828,000
Republic Steel Corporation	296	215,000	964	*5,577,000	*5,792,000
Sharon Steel Corporation	....	.....	60	236,000	236,000
Carpentertown Coal & Coke Co.	277	160,000	....	.....	160,000
TOTAL	277	160,000	60	236,000	396,000
United States Pipe & Foundry Co.	....	.....	180	900,000	900,000
United States Steel Corporation:					
United States Steel Corp. (Central Operations)	1,716	1,042,600	2,903	14,185,900	15,228,500
American Steel & Wire Division	....	.....	295	1,418,100	1,418,100
Columbia-Geneva Steel Division	....	.....	308	1,345,700	1,345,700
National Tube Division	....	.....	413	1,869,000	1,869,000
Tennessee Coal & Iron Division	....	.....	558	3,096,900	3,096,900
TOTAL	1,716	1,042,600	4,477	21,915,600	22,958,200
Wheeling Steel Corporation	....	.....	314	1,720,000	1,720,000
Woodward Iron Company	....	.....	256	938,000	938,000
Youngstown Sheet and Tube Company	....	.....	780	4,140,000	4,140,000
GRAND TOTAL	2,906	1,745,600	13,758	70,452,660	72,198,260

* Includes 50% of coke capacity of the Donner-Hanna Coke Corporation, Buffalo, New York

Adolph O. Schaefer

Solving Steel's Human Problem

A soft spot in the future of steel is a shortage of metallurgists, warns Mr. Schaefer.

If the human equation is to be balanced, the problem must be met now in our schools.

ADOLPH O. SCHAEFER: Know-how is the most important ingredient.

▪ Building a top-rate forging company takes a lot more than brick and mortar, equipment, and financing, says Adolph O. Schaefer, president of Pencoyd Steel & Forge Corp. You've got to have technical talent or you're almost licked before you start, he points out.

Mr. Schaefer, who is one of the nation's outstanding metallurgists, learned that lesson well when he and a group of associates formed their own company in 1956.

Something Lacking — They bought out the old Fairmount Steel Corp. in Philadelphia and renamed it Pencoyd—a name it bore in earlier times. Schaefer had at his disposal a completely integrated steel forging plant. But it was only half the job done.

"Metallurgical know-how might be an indigestible term," he explains, "but it's the most important ingredient that goes into a forging. It's the element that tilts the balance in favor of perfection."

Growing Shortage — In the months following, he left no stone unturned in his search for a metallurgical staff that would rate second to none. He sifted through the acquaintances he made during 34 years in the field.

It was tough going, but he finally came up with the men he wanted. Mr. Schaefer points out that the difficulty in getting metallurgical manpower, such as he faced, and fortunately overcame, will in time grow more severe unless action is taken. Encouraging young men to follow careers in metallurgy has become one of his foremost interests outside of Pencoyd.

Working at It—He currently is chairman of an American Society for Metals committee which awards scholarships in metallurgy. Last year, 56 scholarships were granted by this group. And Mr. Schaefer is also chairman of an industry-sponsored foundation whose goal is to draw up plans for finding and training new metallurgical talent.

A native Philadelphian, Mr. Schaefer began his career in 1922 with a B.S. degree in chemical engineering from the University of Pennsylvania. He started as research metallurgist for Midvale Steel and Ordnance Co. He was a vice president in 1956, when he left to organize Pencoyd.

Adolph Schaefer's abilities have been put to good use by the professional societies. He is past president (1956) of the American Society for Metals. He also served two terms as Philadelphia district chairman, American Society for Testing Materials.

Our advancing technology demands new and better steels, says Mr. Schaefer. But to make them the steel industry must have many more well-trained men in its laboratories.

General Cable solves 4-way pumping problem

How to secure maximum rate of production for varying sizes and types of lead sheathed telephone cable posed a 4-way problem for General Cable Corp.

1. Since the maximum extrusion rate for lead through a sheathing die varies for different size cables, hydraulic pumps must have variable capacity characteristics so they can be set for the exact capacity giving maximum rate of production for each cable size.
2. Pumps have to be able to maintain pressures *accurately* at any given point between 4500 and 6000 psi. The pump pressure controls the rate of cable production which is impaired by any variation in pressure.
3. 100% dependability is a must. Any failure of pump or press could result in a break in the sheathing and rejection of an entire reel.
4. Pumps must handle water as a hydraulic medium . . . completely eliminating any fire hazard.

General Cable solved the problem by installing Aldrich-Groff variable stroke pumps . . . the first in 1942, followed by 3 more in 1944, 1948 and 1949. Eleven others were added in various General Cable plants. Aldrich-Groff Pumps provide stepless, straight-line capacity control from zero to rated output. Pump delivery can be adjusted for the maximum rate of extrusion for the size and type of cable being covered and pressures are accurately maintained indefinitely.

Result: Since their installation, these Aldrich-Groff Pumps have more than met the Company's need for accuracy and reliability. They operate continuously, around the clock, six days a week. On one occasion, three of the pumps operated continuously for six months! If you have a pumping problem, we'll be glad to send you full information on Aldrich Pumps and their advantages to you. Write Aldrich Pump Company, 29 Pine Street, Allentown, Pa.

the toughest pumping problems go to ALDRICH

Who Benefits from Productivity?

The auto industry shows signs of giving up on its "productivity factor."

Annual wage increase based on increased productivity now has reached the point of diminishing returns.

Indications are automakers will buck a continuation of the principle.

▪ An over-worked word these days is "productivity." You'll hear a lot more about it as the United Auto Workers and the auto industry get ready for their contract showdown this spring.

The auto industry once took the annual "productivity factor" in its stride. It even voluntarily reopened a three-year contract to raise the annual productivity pay boost from five cents per hour to six cents.

Times Have Changed—The industry then apparently had little trouble in making up the annual productivity raise by improved manufacturing methods and new and improved tools and equipment.

But no longer. Automakers now see the point in diminishing returns at hand. The annual factor now has the appearance of a built-in inflationary factor and the industry would like to get off the hook.

Money and Principles — Autoworkers, on the other hand, don't see it that way. First, they want the entire benefits of whatever increased productivity is built into their plants. Second, they want that automatic raise by whatever name it's called.

Last week in the Senate hearings on auto price policies, Ford's T. O. Yntema had some things to say on the subject. They apparently now reflect the industry's thinking and possible attitude when negotiations start.

Who's Responsible? — "Output per man-hour is usually called the productivity of labor," he said. "This term, however, is a misnomer because laborers are not responsible for much of the increase in productivity. . . .

"It follows that if workers in a particular industry or company are not responsible for the increased productivity, they do not have any prior claim on such productivity."

Implications are obvious. The auto industry may have to grant an annual raise in a long-term contract. But it does not want to put a "productivity" tag on it any more. The UAW, of course, will do its best to claim the fruits of any gains in manufacturing. It may be a sleeper as a labor-management issue.

A Schedule for Economic Growth

Look to the Long Term—In the middle of a short-term crisis, you can find all kinds of long-term assurances.

In fact, ability to see beyond the current recession is one of the outstanding characteristics of business leadership today. Confidence in the over-all soundness of the economy and belief in its long-term growth aspects stand out.

Rate of Climb—The Committee for Economic Development this week predicts a steady rate of climb in the gross national product, in constant dollars, that points to a continuing era of greater national prosperity.

The CED predicts increases of 3 pct per year in the gross national product and 2 pct per year in output per man-hour. This rate would bring us, by 1975, to a gross national product of over $725 billion.

The CED's conclusion:

"One result would be that by 1975 the disposable income of the average family—after payment of all taxes—would be in the neighborhood of $7100, expressed in dollars of 1956 purchasing power. The increase over the present family disposable income of $5300 would exceed the amount the average family now spends on food and clothing combined."

Ups and Downs—It's conceded that "growth does not proceed at a uniform rate . . . periodically business recessions have interrupted growth." But the prediction is based on the average rate of growth since 1900, a period of sufficient length embracing enough ups and downs to appear a valid base for projecting less than 20 years further.

The effects of such an increase in GNP are obvious. And the potential of the next two decades makes the present period of constriction look a little out of place. But it also has the effect of putting it in the proper perspective of a short-term cycle.

Encouragement Needed — The immediate business outlook is not encouraging and the experts are not all agreed that the end of the downswing is right around the corner. But in the face of short-term gloom, it's wise to keep the overall trend of growth well in mind.

Computers: New Proving Ground

They'll Take Over More Future Testing Tasks

GM engineers find that a computer can bypass a lot of time-consuming experiments.

The main obstacle is reducing engineering problems to formulas.—By H. R. Neal.

■ The day may not be far off when elaborate automotive testing laboratories and proving grounds will be replaced by electronic computers. General Motors already has taken some big steps in that direction.

Engineers at GM Technical Center have successfully tested the steering and handling characteristics of a car by means of a computer. They have also run computer tests on a new gas turbine engine and a free piston engine.

New Versus Old—To cost-conscious automakers, the trend to computers is a logical one. Present testing methods are both costly and time-consuming. Prototype models of engines, suspensions, auto bodies, and thousands of parts must be built and tested in use before designs can be properly evaluated—and possibly discarded.

The computer tests mentioned above were conducted in vastly less time. Results were known and evaluated long before enough data could have been gathered under conventional methods.

Making Progress — At this moment, a complete car can't be tested on computers. One of the big obstacles is defining the problems—reducing designs and tests to formulas and combining formulas before putting the whole problem into the computer.

But GM's progress to date is significant and interesting. In the steering test, a steering wheel is attached to an analogue computer. The computer is then linked with an automobile handling simulator. A miniature car, controlled by a servomechanism, stands on the simulator. The miniature car responds to various steering "inputs" at the wheel, just as a full-size car responds to the driver's steering motions.

Variables Equated—In addition to straight-ahead motion while going down a highway, a vehicle has certain lateral motions. These include yawing, rolling, or sideslipping. Lateral motions result from steering wheel torques and displacement applied by the driver. Resulting car motion is dependent on speed, wheelbase, gear ratio, weight distribution, tire properties and suspension geometry.

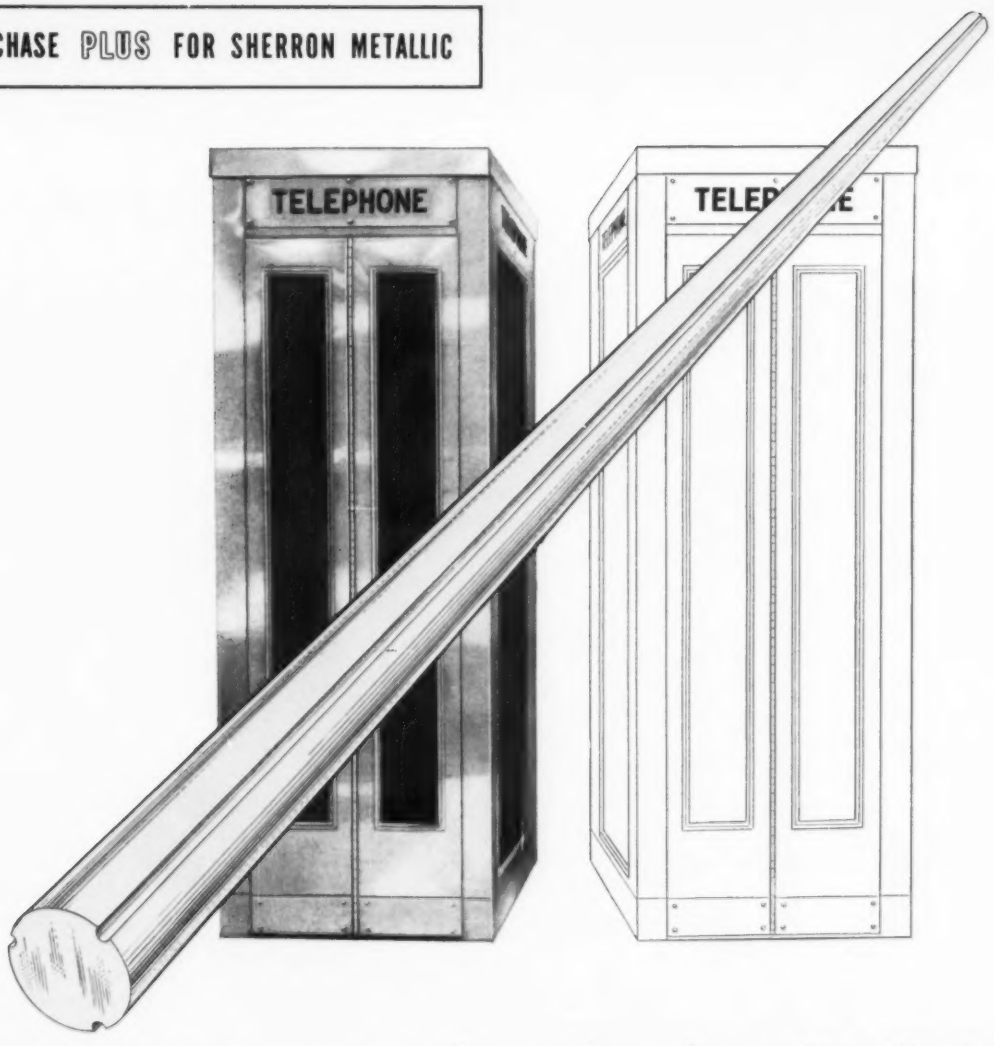
According to Joseph B. Bidwell, head of the Research Staff's Engineering Mechanics Department, equations relating to all of these variables have been developed. Mathematically, they explain how the entire steering or car handling system will respond to driver reactions.

Track Is Bypassed—Adjustment controls on the computer permit changes of any of the variables,

Chevrolet Improves Light Truck Design

THERE'S A DIFFERENCE: Fifty pct more load space for hauling bulky cargoes is offered by Chevrolet's new 1958 Fleetside pickup truck. Body is more than two ft wider and slightly deeper than previous models.

THE CHASE PLUS FOR SHERRON METALLIC



Permanent "*silencers*" for noisy phone booth doors

Largest independent maker of telephone booths, Sherron Metallic Corporation came to Chase Brass engineers with a problem. They wanted a 76" long hinge pin for doors on their all-metal outdoor-indoor booths, a pin that had to resist extremes of heat and cold, operate without squeaks, never corrode or bind.

Working with CHASE, Sherron designed a special brass shape with lengthwise grooves, machined to extremely close tolerances. These grooves are packed with a special all-weather lubricant. Installed in the Sherron booth, they give lifetime service without further maintenance.

CHASE engineering can help you solve a problem—either by designing special shapes like this one, or by choosing the *right* alloy for your needs in strip, sheet, rod, tube, or wire by CHASE of Kennecott Copper. Talk over the details of your own specific problem with CHASE—either locally or at Waterbury 20, Connecticut.

You can get the right alloy from ... Chase

BRASS & COPPER CO.

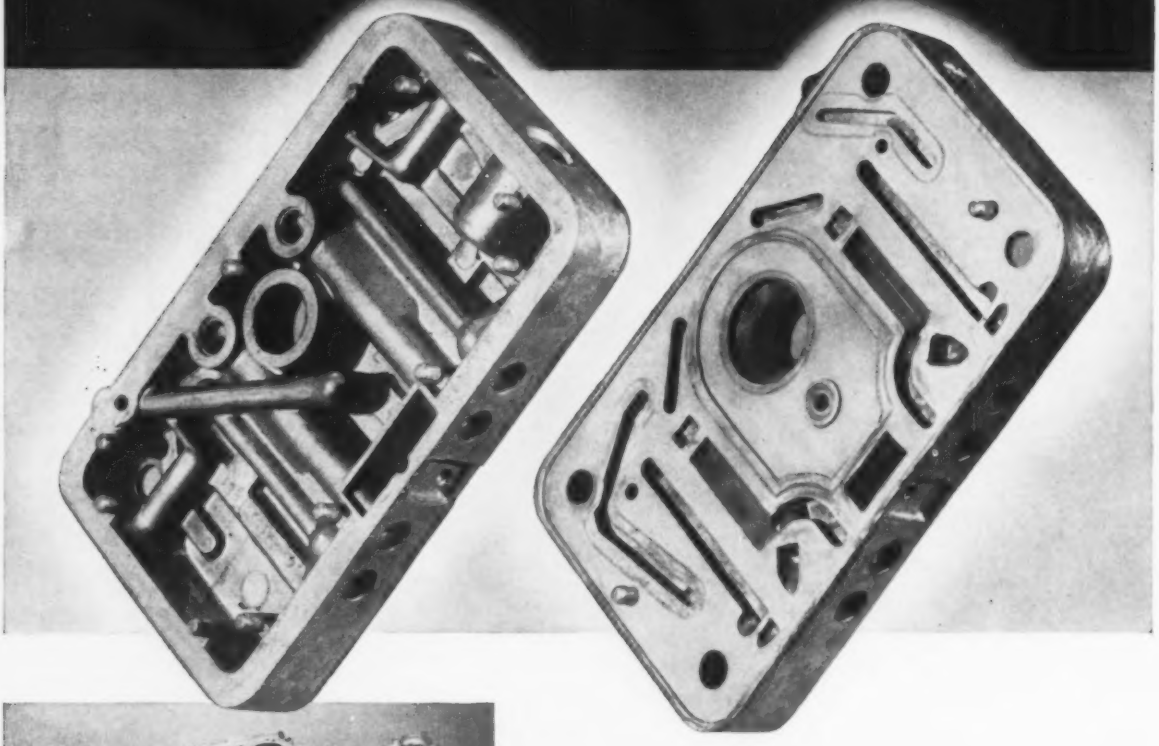
WATERBURY 20, CONNECTICUT
SUBSIDIARY OF KENNECOTT COPPER CORPORATION

The Nation's Headquarters for Brass, Copper and Stainless Steel

Atlanta Baltimore Boston Charlotte Chicago Cincinnati Cleveland Dallas Denver Detroit Grand Rapids Houston Indianapolis Kansas City, Mo. Los Angeles Milwaukee Minneapolis Newark New Orleans New York (Maspeth, L. I.) Philadelphia Pittsburgh Providence Rochester St. Louis San Francisco Seattle Waterbury

FOR *Extremely Complex Shapes* AND *Close Tolerances*

ZINC *DIE CASTINGS ARE BEST*



14 ZINC Die Castings make up principal components of the Holley four-barrel downdraft carburetor.

HOLLEY Carburetor Co. has these exacting metering bodies as well as 12 other principal parts of the Model 4150 carburetor made of ZINC because ZINC Die Castings are best suited for the job. Extreme complexity of shape of all these components, close tolerances of the air and fuel passages in the metering bodies and rigid efficiency requirements of the product demand the accuracy, strength, reliability and economy of ZINC Die Castings.

HORSE HEAD SPECIAL ZINC AND ZAMAK ARE PRODUCED BY

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DEVELOPERS OF THE MODERN ZINC DIE CASTING ALLOYS IN USE TODAY

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HORSE HEAD PRODUCTS ®

Automotive Production

WEEK ENDING	CARS	TRUCKS
Feb. 8, 1958	107,045	18,391
Feb. 9, 1957	174,163	22,957
Feb. 1, 1958	104,349	18,355
Feb. 2, 1957	140,411	22,953
TO DATE 1958	597,484	99,355
TO DATE 1957	816,181	121,453

*Preliminary Source: Ward's Reports

giving the "brain" new problems to solve—and the engineers new answers.

Engineers then have an immediate visual idea of how a full-size car will act under the same manipulation of the steering wheel at speeds ranging from 30-100 mph—without having to whiz around a test track at top speeds.

Engine Tests — Using data obtained from earlier prototype free-piston engines, engineers evolved other mathematical equations. These are designed for producing simulated free piston engine designs and running them mathematically through a complete series of tests. Countless experiments with prototypes are eliminated.

Problems can be worked out in terms of practical variables. Engineers don't have to use "fictitious numbers." Instead, they can use the same indications they now get from conventional gages and instruments used in dynamometer test cells.

Used on Firebird II — The gas turbine engine for GM's highly publicized Firebird II experimental car was "built" on the Tech Center computer in much the same manner as the free piston engine.

GM had already produced two gas turbine engines. From prototype tests, equations evolved. Before specifications for the third engine ever reached the shop, more than 60 different engine designs were "built" mathematically on the computer.

Programming Takes Time—Months before the engine ever appeared, engineers knew how it would perform. Without the computer's help, they would have had to build several experimental engines. On top of that, additional engineers would have been needed for weeks of sliderule calculating.

None of these problems were solved overnight—even with a computer. Months of work went in preparation or programming the design problems. But each problem was run off by the computer in a matter of minutes.

Frees Men's Minds—In 1956, the late George Granger Brown, dean of the engineering college at University of Michigan, explained the true value of the computer in engineering research. "The first industrial revolution took the load off men's backs. But the present revolution is also taking the load off men's sliderules. It is freeing their minds. . . ."

Auto Production Off in January

January passenger car production figures speak, with one exception, of the gloom that hangs over the automobile industry. The one exception is American Motors which more than doubled its production figure over the same month a year ago.

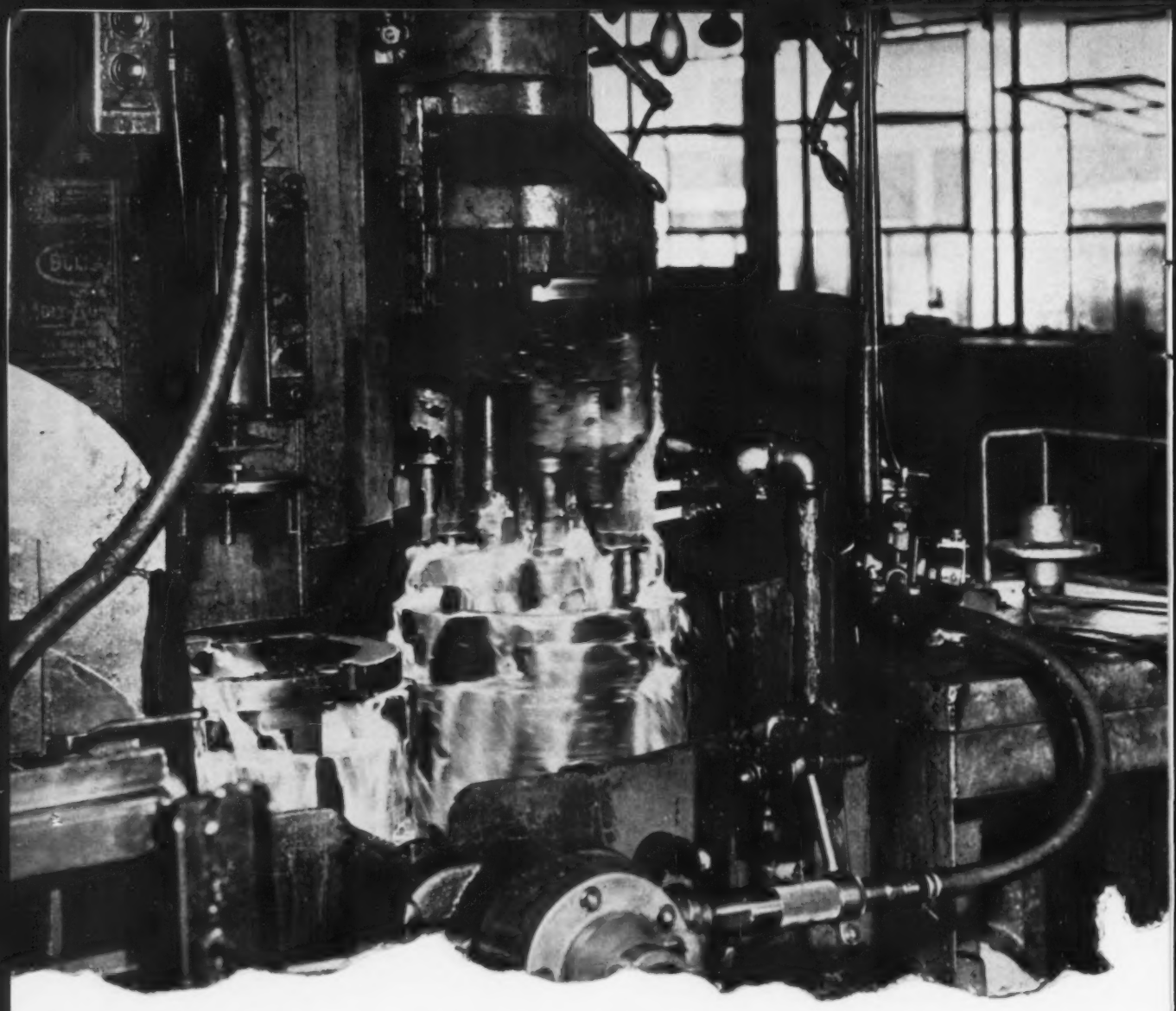
During January, U. S. auto production dropped to 489,357 units compared with 641,436 a year ago. It was the lowest January output since 1954.

Dim February Outlook — Cutbacks in the last half of the month were more severe than in the first half and are not fully reflected in the month's totals. February, with fewer production days, could see output dip close to the 400,000 unit mark.

AMC's output of Ramblers climbed to 16,311 units—a record for monthly production, the company said. In 1955 the firm built 6217 units, including 876 Nash and Hudson cars, now out of production. Nearly 3500 units of last month's production were in the 100-in. wheelbase American model.

Chrysler Corp., plagued with labor problems and diminishing sales, took the greatest plunge of the month compared with a year ago. Total production fell to 59,927 units.

THE BULL OF THE WOODS



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Rust in a valuable machine tool or on finished parts can sometimes cost you thousands of dollars—and it's often difficult to prevent. But it *can* be prevented. Proved in the field and constantly improved for more than 30 years, Texaco Soluble Oils have shown that they give full protection against rust.

In addition, Texaco Soluble Oils have excellent cooling and other properties—assuring longer tool life. They keep machines cleaner, emulsify readily with water, remain stable, and assure freedom from odor problems.

These are some of the reasons for machining with Texaco. And there are many others. Your local Texaco lubrication representative will be glad to give you the complete details and help you select the proper coolant from a full line of Texaco Cutting, Grinding and Soluble Oils. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

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LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

Government Help Is on the Way

Federal Projects Will Help Stem the Downtrend

Business is fast approaching the bottom of the cycle, although the downtrend still continues.

Federal spending and other government projects will soon help out.—By G. H. Baker.

▪ Administration officials are predicting glumly that U. S. unemployment will probably hit an eight-year peak this month. (Previous high point in the number of jobless since 1940 was 4.6 million, reached in 1950.)

Way it looks now, the total number of unemployed will catch up or pass the 1950 record before the end of February.

Better Things Ahead—But the total will begin to decrease next month, the experts say. Here are some of the factors already at work which will produce new jobs in the months immediately ahead:

Defense spending is running about 75 pct ahead of outlays in last half of 1957.

Lower interest rates are sparking a construction drive—residential housing, new plants, schools, and hospitals.

Federal funds for new roads will rise by $600 million, starting in July.

Federal money for urban renewal and redevelopment is set for a $25 million rise at the same time.

Export-Import Bank loans (to foreign enterprises) are to rise by $400 million this year. (The loans will be used to buy steel and metalworking equipment in the U. S., thus adding to employment here.)

All of these factors point to an early resumption of production activity and to rising employment. Actually, the pick-up is coming sooner than some of the experts would have you believe. Stimulating influences now at work are going to start boosting production and sales within the next 60 to 90 days.

Emergency Funds Go to Work

Missiles programs and other emergency defense measures are newly backed by $1.4 billion in special funds.

All but $150 million of this amount is separate from the military budget for the fiscal year ending June 30. Congress last week approved transfer of the $150 million from funds previously voted and added it to $1.26 billion in new money.

The lawgivers thus acted in a matter of weeks on the White House plea for more dollars to speed national security projects. In the main, the money is directed into missiles and missile detection work, missile-launching submarines, and air base dispersal.

Bulk of the funds—$910 million—will go into Air Force activities. Spending will be for both midrange and intercontinental missile programs and for more secure dispersal of Strategic Air Command bases.

Navy is getting $350 million of the funds just voted. Chief use of the money will be to build three specially-designed submarines. These will carry and launch the Polaris, a solid-propellant guided missile with a range of about 1,500 miles.

For the Army, $40 million is earmarked for various missile projects, including Lacrosse, Little John, Dart, and Pershing.

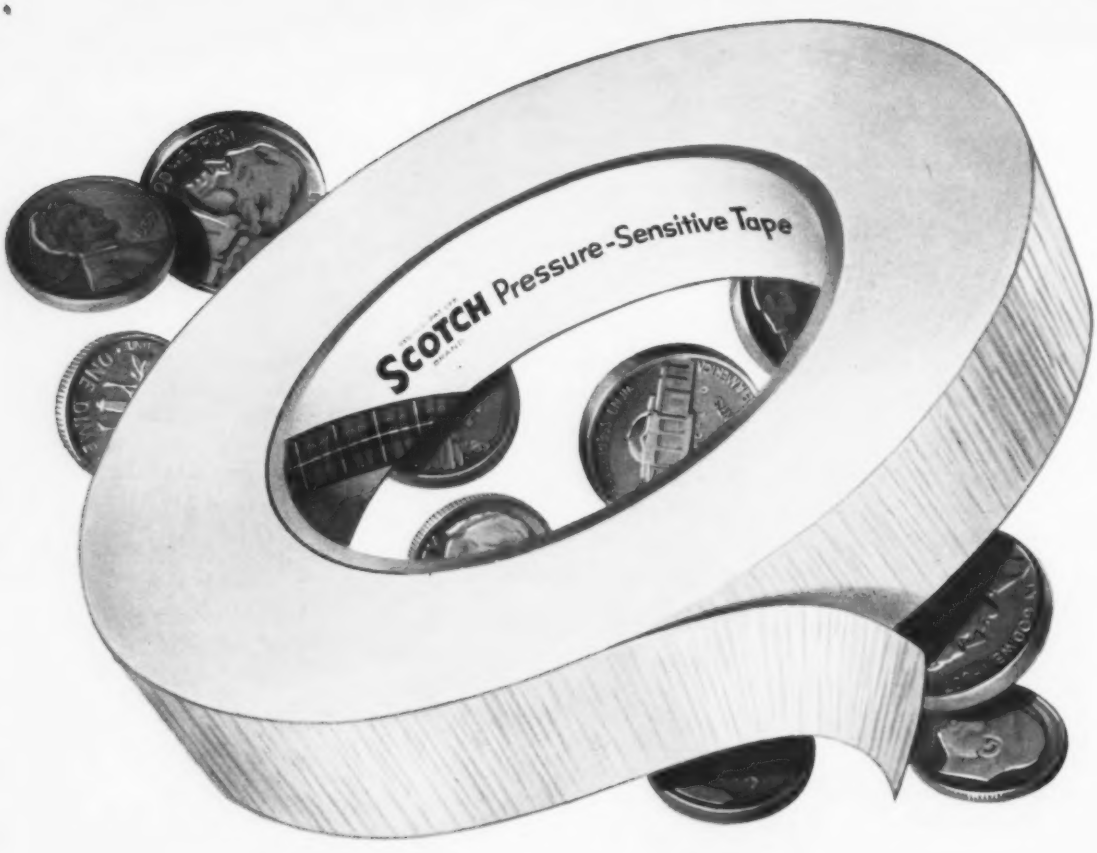
Here's the Latest on Expense Accounts

Close Scrutiny—Unrestricted expense accounts will be the prime target of forthcoming government regulations.

As tentatively drafted, the new regulations to cover 1958 income will permit expenses consisting of trivial reimbursements, such as phone calls and taxicabs, to go unlisted; require only a general listing of more substantial spending such as travel costs, but will require detailed itemization of flat allowances.

Blocks Tax Dodge—This plan, the tax men figure, will give them a way of collecting taxes on whopping expense accounts, often given top executives and others as an untaxed salary increase so taxes won't eat up all the raise. And it will also ease ciriticism over earlier plans which would have had even the casual expense accounts under strict itemization rules.

Remember Line 6-A—The new reporting requirements will cover 1958 income, and will show up officially on the tax forms to be filled out in the spring of 1959. All expense payments, big or little, will have to be reported in full as income and then deducted as spending on the so-called line 6-A of next year's tax forms, but only the big accounts will be required to submit details.



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√ **MULTIPLE PLANTS**—Reliable sources of supply through 3M tape manufacturing plants and warehouses located from coast to coast.

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For complete information on the right "Scotch" Brand Pressure-Sensitive Tape for your needs, write 3M, Dept. DE-28, St. Paul 6, Minnesota.

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...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

Steel Imports Hurt Coast Mills

They've Risen Almost 90 Pct in 5 Years

Foreign steel can undersell domestic product by as much as 25 pct in Farwest markets.

Bar shipments from abroad rose 700 pct last year, but pipe and wire are still leading imports.—By R. R. Kay.

▪ The rising tide of imported steel on the West Coast has domestic mills worried.

Foreign competition is not new to them, but the producers are concerned by the rapid rise in the volume of imports. They've climbed 88 pct since 1953. And last year alone they went up 20 pct. The rate of the national increase in 1957 was only 5.5 pct.

Domestic Price Disadvantage— Why the big upsurge in imported steel in the West compared with the rest of the country? It's simply a case of arithmetic.

The historically higher prices for steel products in the Farwest make it possible for England, France, Western Germany, and Australia to undersell domestic mills in their own back yard by as much as 25 pct even after the long haul involved.

Japan, for instance, can shave U. S. prices in spite of the premium prices it paid for scrap at West Coast ports in 1957. Some experts estimate Japan's scrap costs at $70 to $80 a ton, including shipping, as compared with $40 to $45 for West Coast mills.

Beware the Flood — One mill spokesman fears "Japan might some day flood the Western market with plates, shapes, reinforcing bars (already Japan's second best seller in the West), and hot rolled sheet once they catch up on their shipbuilding."

Pipe, which heads the steel import list, accounted for 38 pct of the finished products shipped into the seven Western states from foreign countries in 1957. Wire nails represented 18.5 pct of the total and other wire products 20 pct, according to Department of Commerce figures.

Ten pct was structurals (mostly from Belgium-Luxembourg), 5 pct bars and about nine pct was sheets, plates, and other products.

Bar Imports Rise — One mill spokesman declares: "Our sale of ½-in. to 4-in. pipe has been seriously curtailed because of this foreign competition. We are unhappy about it—but we just can't meet the price. We've simply had to cut back our operations at the expense of the local economy."

Imports of steel bars, including reinforcing, skyrocketed 700 pct in 1957 over 1956. Though the total of this product still is only five pct of all the finished steel shipped into the West, it's a potential threat to the numerous small mills majoring in the item.

Heavyweights Set for a Trip by Rail

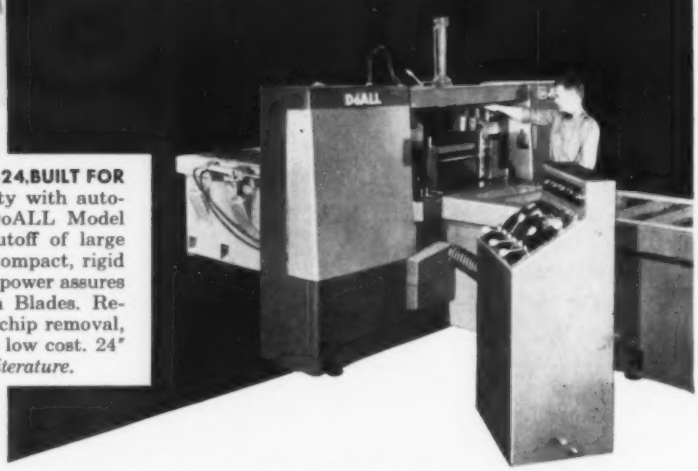
BOLTING DOWN: Bridge girders, each weighing 19 tons, are checked at fabricating works of Bethlehem Pacific Coast Steel Corp. before shipment. They'll go into bridge under construction at Missoula, Mont.

Before you buy any cutoff saw—
see these NEW DoALL POWER SAWS

NEW MODEL C-12, ACCURACY AT LOW COST Ideal for small shops or for intermittent production. Ample power and rigidity assure maximum performance from Demon High Speed Steel Blades. This model cuts mild steel at 10 sq. in. per minute. Unsurpassed for accurate machining of tough, expensive steels, pipe, structurals, etc. Four speeds. 12" x 12" capacity, manual control. *Write for new literature.*

NEW MODEL C-58, HIGH PRODUCTION, COMPLETELY AUTOMATIC World's fastest automatic cutoff sawing—easily adapted with standard attachments to meet any specific production requirement. Designed expressly for Demon High Speed Steel Blades. Infinitely variable speeds. 12" x 12" capacity. Also available in Model C-57, with manual control. *Write for new literature.*

NEW AUTOMATIC MODEL C-24, BUILT FOR YOUR BIG JOBS Giant capacity with automatic operation makes the DoALL Model C-24 excellent for low-cost cutoff of large billets, pipe and structurals. Compact, rigid design combined with extreme power assures full performance from Demon Blades. Reversible conveyors, automatic chip removal, automatic control available at low cost. 24" x 24" capacity. *Write for new literature.*



You name the cutoff job *and DoALL will show you how to cut it faster, cheaper and more accurately than any other machine can do today!*

Better still, DoALL will provide the exact type and size band machine you need to fit your budget—whether it's for smallest toolroom jobs or high-production runs.

DoALL *integrated design* is the secret—powerful, rigid band machines designed to get the full performance from world-famous DoALL Demon High Speed Steel® Blades. This engineered combination gives you up to six times the cutting speeds of other band saws . . . up to twice the speeds of power hack saws of comparable capacity. Find out *how* you can save time and labor, reduce cutting-tool costs, minimize material waste and hold down your capital investment. Call your DoALL Store today, or write The DoALL Company, Des Plaines, Illinois.

PS-12

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Tide Ebbs for Tool Exporters

But Foreign Tool Imports Approach the Flood Stage

It's a grim situation for domestic builders, who are combing the beach for sales.

Quick service and quality are probably their best selling weapons.—By E. J. Egan, Jr.

▪ U. S. machine tool builders are in a sweat over dwindling export sales, plus the fact that more and more of their American customers are buying imported machines.

Twenty years ago, about 32 pct of the U. S. industry's annual dollar volume was sold out of the country. In the 1952-1956 period the percentage dipped to a little under 12. Builders find the picture even more unpleasant when they consider the difference between today's dollars and those of 20 years ago.

The Gap Narrows—On top of this, U. S. machine tool imports have zoomed to new highs each year since the Korean War ended. Total imports of all types of metal cutting and forming equipment should be about $38 million when the final 1957 figures are in. That would be about a 55 pct gain over 1956 imports and a whopping 135 pct improvement over the 1955 total.

On balance, U. S. machine tool exports are still three to four times the dollar value of imports. But the gap is narrowing steadily.

Tariff Barriers—One reason is that export sales have been hampered in a number of ways since the end of World War II. Dollar-short nations all over the world threw up screens of tariffs and taxes to keep U. S. machine tools out and give their own builders a chance to make a comeback.

Comeback efforts have been felt far and wide, as U. S. builders reluctantly testify. Foreign equipment in American metalworking plants is almost as common as the sight of foreign cars on the nation's highways.

Price or Service — Why should this be? Price is the best answer. When several thousands of dollars separate the delivered prices of U. S. and foreign lathes, radial drills, gear hobbers and milling machines of presumably equal quality, there are plenty of people who can't resist the bargain.

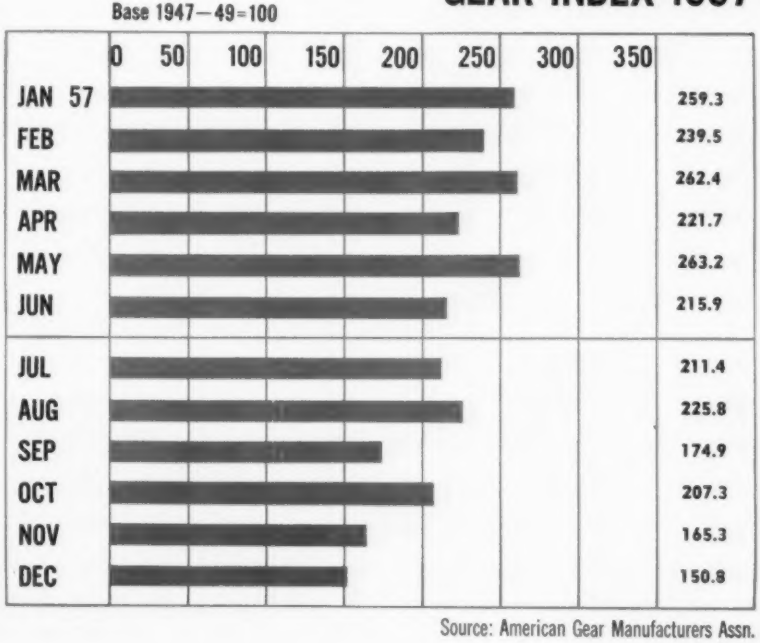
What about service on foreign machines? Buyers admit it's generally a tougher problem getting parts and factory counsel than it is with American equipment. But in view of the growing popularity of many types and makes of foreign machines, the problem doesn't appear insurmountable.

Plan of Action—One Midwest builder says he'll keep on talking up the quick-service angle for all it's worth, but he's not going overboard on it. Instead, he's going to plug quality.

The same builder figures on adding still another string to his sales bow: A willingness to do more to fit his machine to individual customer needs.

He admits that foreign builders have been willing to make concessions to customer's requirements, altering stock models without complaint and resisting the urge to charge "special" prices. "If it works for them, I'll give it a try myself," he says.

GEAR INDEX 1957



Source: American Gear Manufacturers Assn.

INDUSTRIAL BRIEFS

Brooklyn Expansion — The Albert Pipe Supply Co., Inc., has opened a new facility in Brooklyn, costing more than $1 million, for supplying tubular products and accessories of aluminum, steel, wrought iron and plastic. Larger capacity crane equipment and modern facilities for cutting, threading, grooving and welding are features of the new plant.

Expansion Completed — Rust-Oleum Corp., Evanston, Ill., has completed its two-year $600,000 plant expansion program. New additions include enlarged office space and a new company cafeteria in the administrative buildings. New production facilities in the manufacturing division includes a three-story, 12,000-sq-ft warehousing unit as well as the installation of new ball mill equipment and a new automatic packaging system.

High Sierra Capacity—New steel processing machinery costing about $60,000 has been installed at the Los Angeles plant of Sierra Drawn Steel Corp. Equipment includes a $33,000 straightener and a five-ton draw block costing more than $25,000. The equipment raises by nearly 50 pct the plant's capacity for small-diameter steel bars used in manufacture of oil equipment, farm tools, industrial machinery, calculators and other products.

"Seems I made a little mistake when I ordered these ball bearings!"

Third Term—H. Thomas Hallowell, Jr., president of Standard Pressed Steel Co., was re-elected president of the American Standards Assn. for a third consecutive term. Others elected were: J. R. Townsend, vice president; J. G. Lawrence, M. J. Pitre, R. W. Summery, H. R. Huntley, M. J. Murphy, V. deP. Goubeau, and J. R. Dube, directors.

Newcomen Commendation—The Newcomen Society in North America selected Leeds & Northrup Co. as the organization to be honored at its annual Franklin birthday meeting held in Franklin Institute, Philadelphia.

Job for Inland—Inland Steel Co., Indiana Harbor, Ind., awarded to Salem-Brosius, Inc., Pittsburgh, a contract for the design and erection of two 4-zone furnaces. They will be placed in their structural mill at Plant No. 2. The furnaces, operating on coke oven gas or fuel oil, will be used for reheating steel blooms preparatory to rolling. Furnace pressure, temperature and the fuel and air input will be controlled and recorded automatically.

GE Expands Nuclear Fuel—General Electric's Atomic Power Equipment Dept. has completed a $1.5 million addition to its facilities for manufacture of nuclear fuel elements. New addition will make it possible for the department to carry on large-scale production of plate- and rod-type fuel elements on a commercial basis. Current plans calls for marketing these elements to other organizations in the nuclear industry.

For Missile Subs—Westinghouse Electric Corp. will design and furnish reactor compartment components for three nuclear powered Fleet Ballistic Missile submarines. Total contract price is $18,630,000 and is of the cost plus fixed fee type. The equipment to be procured for the Navy under this contract will be purchased by Westinghouse from industry using competitive bidding to the greatest degree practical.

Around the World—Switzerland, India, Tunisia, the Dominican Republic, and the Commonwealth of Puerto Rico have entered the 1958 U. S. World Trade Fair. This brings the present total of participating countries to 31. The second annual U. S. World Trade Fair will be held at the New York Coliseum, May 7-17.

Porter Acquires Kidd — Kidd Drawn Steel Co., Aliquippa, Pa., has been acquired by H. K. Porter Co., Inc. Kidd, manufacturers of drill rod and other special shapes of cold-drawn steel, will be combined with the Vulcan Crucible Steel Div., whose property it adjoins. Vulcan Crucible, one of ten Porter divisions, is a basic producer of carbon, alloy and high speed tool steels.

Plugs for Mexico—The Champion Spark Plug Co., Toledo, has formed a new Mexican subsidiary to manufacture and distribute Champion spark plugs in Mexico. Known as Bujias Champion de Mexico, S. A., it will have its plant in Industrial Vallejo, and will be equipped with machinery, tooling and inspection devices from the parent company. All Bujias Champion de Mexico supervisory personnel are being trained at the company's headquarters in Toledo.

Sintering for J&L—A new ore sintering plant, installed at a cost of about $7 million, has been put into operation at the Cleveland Works of Jones & Laughlin Steel Corp. The plant has a daily capacity of 2500 tons. It replaces an older facility which was averaging about 1/6 of the present capacity. Existing blast furnace capacity at the Cleveland Works will be increased to about 2500 tons of pig iron daily, a rise of about 300 net tons.

Rolling Along—The Penn Mfg. Co., Newington, Conn., producer of rolling mills and other metal forming equipment, has been awarded a large rolling mill contract for the General Electric ANP project at Cincinnati, O. The contract includes three tandem rolling mills and special material handling equipment.

Williams Superratchets®

50% Stronger than Government Requirements

41 TEETH give 82 tooth action; require less than 4½° to rotate nut.

Williams patented B-52 and S-52 Reversible Ratchets combine maximum strength with minimum wear to extend tool life. Functional precision design plus drop-forged, heat-treated construction from selected alloy steel. Williams "Supersockets" are part of the Broadest Line of Its Kind.

STRESSES evenly distributed throughout entire mechanism.

HARDER THE PULL on the handle the more teeth come in contact.

RUGGED CONSTRUCTION No one part bears the bulk of stresses.

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FINEST IN FIT, FEEL AND FINISH

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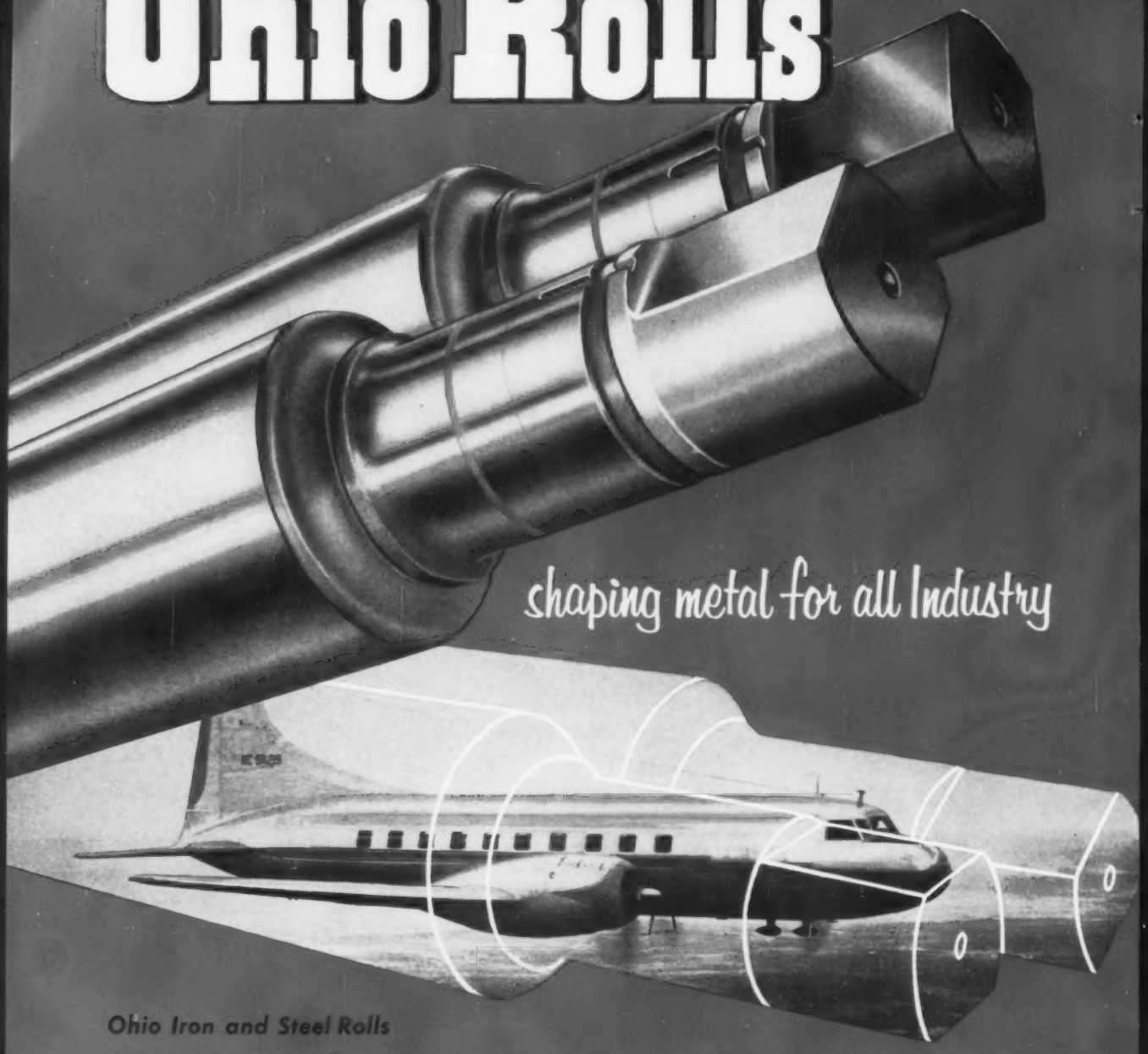

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Chilled Iron Rolls
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OR18

V. J. Roddy, elected president, American Screw Co., Willimantic, Conn.

W. C. Higdon, elected vice president, planning and development, Armco Steel Corp; **T. F. Olt,** elected vice president, research; **W. F. Tuttle,** appointed director, engineering; **J. B. Whitlock,** appointed chief engineer, Armco Div; **K. P. Campbell,** appointed manager, Houston plant, Sheffield Div.; **C. L. Lloyd, Jr.,** becomes asst. manager.

C. H. Pomeroy, named chairman of the board, National Malleable & Steel Castings Co., Cleveland.

W. M. Troutman, named vice president, General Refractories, Co., Pittsburgh office.

Major Gen. Albert Boyd, elected vice president, Westinghouse Electric Corp. and general manager, Defense Products Divisions.

Norborne Berkeley, elected vice president, Bethlehem Steel Corp.

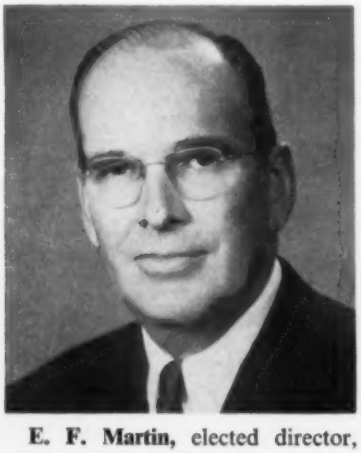
Carter Kissell, elected president, National Malleable & Steel Castings Co., Cleveland.

T. L. Welsh, elected president, Pittsburgh Induction Heating Co., Inc., Pittsburgh; **R. L. Miller,** elected vice president; **J. B. Haines,** elected treasurer; **J. P. McComb, Jr.,** elected secretary.

R. J. Engler, elected vice president and sales manager, E. Keeler Co., Williamsport, Pa.

J. J. Drexler, elected vice president, Edgcomb Steel Co., Philadelphia.

T. H. Brumagin, appointed general sales manager, Ajax Flexible Coupling Co., Inc., Westfield, N. Y.



E. F. Martin, elected director, Bethlehem Steel Corp.

H. V. Bootes, appointed executive vice president, Shippers' Car Line Div., ACF Industries, Inc.

J. J. Schofield, elected vice president, Detroit Harvester Co.

R. H. Seelaus, named secretary and treasurer, Fischer & Porter Co., Hatboro, Pa.

T. J. Buckley, named vice president and general sales manager, The Nylok Corp., Paramus, N. J.; **J. E. Johnson,** becomes vice president, production; **C. E. Borner,** appointed vice president, engineering.

J. H. Dalton, named asst. to the president, Servo Corp. of America, New Hyde Park, N. Y.

W. M. Hankins, Jr., elected president, The Bunting Brass & Bronze Co., Toledo, O.

J. H. Corson, appointed manager, Webb Wire Div., The Carpenter Steel Co., New Brunswick, N. J.

D. D. Hafle, appointed district sales manager, Central Ohio, Acme-Newport Steel Co., Newport, Ky.

H. G. Hilk, named general superintendent, Chicago plant, Clearing Machine Corp.

D. D. Williams, appointed asst. general sales manager, and **C. K. Wiley,** named Pittsburgh district

sales manager, Refractories Div., H. K. Porter Co., Inc.

Fred Kohler, appointed director, research, New Rochelle Tool Corp., New Rochelle, N. Y.

Talbot Shelton, elected director, Bethlehem Steel Corp.

W. F. Pravel, appointed supervisor, tool steel development, Application and Development Dept., Allegheny Ludlum Steel Corp., Pittsburgh.

J. L. Hallett, appointed asst. general manager, Heavy Construction Div., Henry J. Kaiser Co.

E. D. Mairs and **H. J. Morrison,** named asst. general managers, Fabricating Div., Aluminum Co. of America, Pittsburgh.

G. H. Pitts, elected vice president, manufacturing, Bohn Aluminum & Brass Corp., Detroit.

A. C. Bayle, appointed director, engineering, Waltham Precision Instrument Co., Waltham, Mass.

Bernard Mayer, appointed general manager, Alkaline Battery Div., Gulton Industries, Inc., Metuchen, N. J.

W. H. Zuest, appointed manager, special product sales, Diehl Mfg. Co., Somerville, N. J.

F. W. Burgie, appointed general sales manager, Doehler-Jervis Div., National Lead Co., Toledo.

C. A. Barnes, appointed controller, P. R. Mallory & Co., Inc., Indianapolis; **G. M. Arisman, Jr.,** became president, Mallory Battery Co., Cleveland.

G. W. McCarty, elected vice president, research and development, The Black & Decker Co., Towson, Md.

G. A. Kendall, appointed divisional president and general manager, Machine Tool Div., Wickes Corp., Saginaw, Mich.

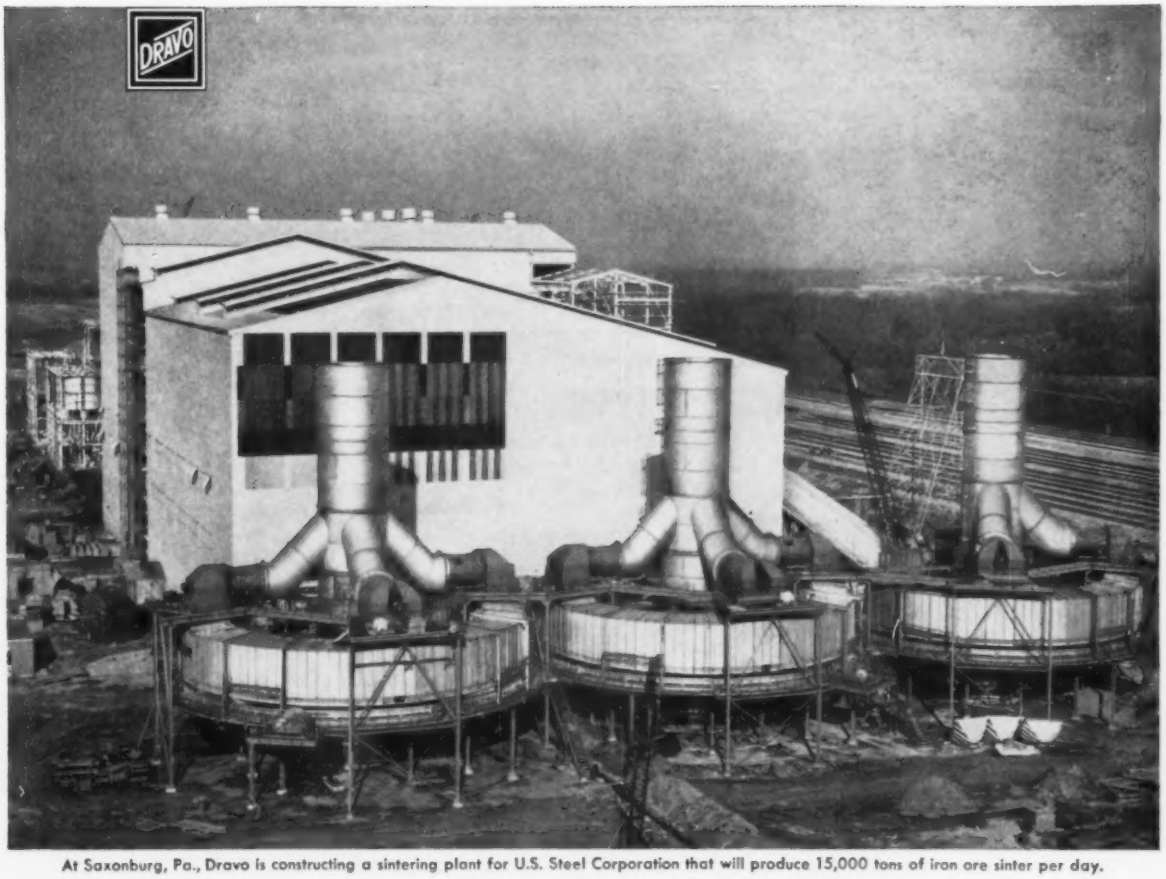
R. C. McCullough, appointed sales manager, Abrasive Dressing Tool Co., Detroit.

A. B. Williams, appointed sales manager, Engineered Electronics Co., Santa Ana, Calif.

A. B. Aycock, named plant superintendent, Southern Pipe Coating Co., Atlanta, Ga.

R. K. Esler, appointed St. Louis district sales manager, Allegheny Ludlum Steel Corp., Pittsburgh.

T. L. Murray, named sales manager, Warehouse Div., The Levinson Steel Co., Pittsburgh; **J. C. Levinson,** named contract manager,



At Saxonburg, Pa., Dravo is constructing a sintering plant for U.S. Steel Corporation that will produce 15,000 tons of iron ore sinter per day.

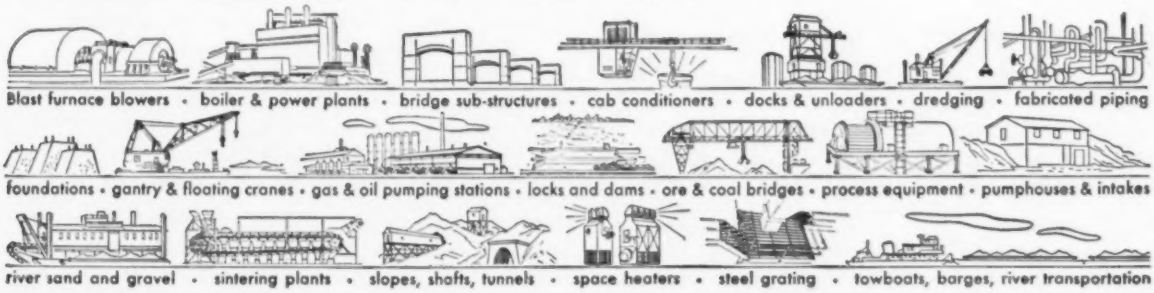
Dravo builds country's largest sintering plants for U. S. Steel

To increase efficiency of blast furnace operations by better utilization of iron ore fines, United States Steel Corporation is building two giant sintering plants—one at Gary Steel Works, Gary, Indiana; the other at Saxonburg, Pa., north of Pittsburgh, to be operated by Edgar Thomson Works.

As exclusive U.S. licensee of the Lurgi Company (Europe's foremost producer of such equipment) Dravo is handling design—and fabrication and erection of mechanical equipment—for both installations. Each includes three sintering machines and three coolers. American Bridge Division of U.S. Steel is handling fabrication and erection of the buildings.

The U.S. Steel and other sintering projects currently under contract at Dravo underscore the growing importance of this process to the steel industry. For information on products and services listed below, write DRAVO CORPORATION, PITTSBURGH 25, PA.

DRAVO
CORPORATION



Blast furnace blowers • boiler & power plants • bridge sub-structures • cab conditioners • docks & unloaders • dredging • fabricated piping

foundations • gantry & floating cranes • gas & oil pumping stations • locks and dams • ore & coal bridges • process equipment • pumphouses & intakes

river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation

He proved that 1 wheel could

Jim Frederick's eleven years of experience as an abrasive engineer have covered most of the problems in the book. That's why he so often finds practical solutions when he runs into problems that are *not* in the book.

Steelcraft operator John Kulpa checks performance of new Bay State wheel on high speed steel form tool job. (Guard removed for photography).

outperform 3 at Steelcraft Tool Co.

Steelcraft Tool Co., of Detroit, used to use three different grinding wheels to rough and finish the angles on straight high speed steel form tools . . . one specification for roughing, two for finishing. Then Bay State came into the picture through distributor Jim Frederick of Detroit's Industrial Abrasives Co. He showed them how a single Bay State wheel specification would cut *fast* for roughing and *fine* for finishing.

Result: The new wheel eliminated the need for repeated wheel changes and both Roland Belardnelli, co-owner of Steelcraft, and John Kulpa, chief operator, rate it A-plus for speed and precision, too.

Why not talk to *your* Bay State distributor? Chances are he'll come up with more than one cost-saving idea for your grinding operations.

Better grinding at lower cost—that is his business.

BAY STATE
WHEELS of PROGRESS

BAY STATE ABRASIVES

Bay State Abrasive Products Co., Westboro, Massachusetts.
In Canada: Bay State Abrasive Products Co., Brantford, Ontario.
Branch Offices: Bristol, Conn., Chicago, Cleveland, Detroit, Pittsburgh. *Distributors:* All principal cities.

Fabrication Div.; **E. Z. Schuman** and **Sherwyn Mandelblatt,** will serve as contract engineers, Fabrication Div.

A. J. Bruner, appointed director, purchasing, American Metal Specialties Corp., Hatboro, Pa.

J. W. Eason, appointed manager, aluminum industry sales, Revere Copper & Brass Inc.

C. E. Russell, appointed steel division plant manager, Ambridge, Pa. plant, National Electric Products Corp., Pittsburgh.

Earl Leas and **T. W. Altum,** appointed tool steel product managers, Earle M. Jorgensen Co., Los Angeles.

M. L. Heald, appointed senior general attorney, U. S. Steel Corp.

Following appointments are within the Steel and Tube Div., The Timken Roller Bearing Co. **Robert Winder,** appointed sales engineer, Los Angeles district office; **Thomas Burnstad,** named sales engineer,

NOW . . . GREATER CAPACITY than any other standard gearmotor . . . and in smaller space!

Capacity up to 200 hp loads, with ratios up to 440:1—that's what you get with the new Philadelphia Type "G" Gearmotor. No other standard gearmotor or in-line reducer on the market offers such high capacity and rugged construction. Yet its compact design gives you the smallest possible power package for any job. The Type "G" is the answer for any application demanding heavy duty, continuous service performance.

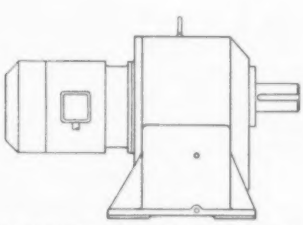
Compact Design. "Shaft-in-line" design makes the new Type "G" Gearmotor more compact and permits complete flexibility in mounting. *Result:* substantial savings in space required. You can even mount the Type "G" without a base plate.

Helical Gearing supports larger loads with maximum power efficiency (96-98%)—assures silent operation, increased strength, longer life. Teeth are crown shaved and induction hardened for optimum performance.

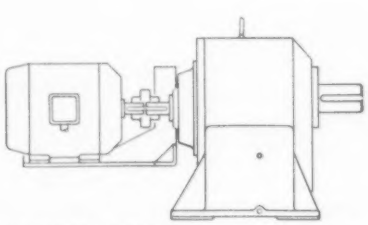
The Type "G" Gearmotor is an extension of the famous Philadelphia Gearmotor Line. It is available as a reducer, gearmotor with motor mounting bracket, or standard gearmotor with flange mounted motor. For complete information, write for Bulletin GM-57-B, Philadelphia Gear Works, Erie Ave. and G Street, Philadelphia 34, Pa.

Offices in Principal Cities • Virginia Gear & Machine Corp., Lynchburg, Va.

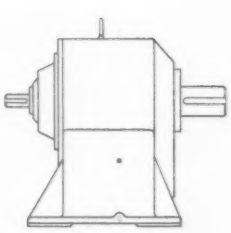
phillie gear®



INTEGRAL GEARMOTOR (Flange Motor)



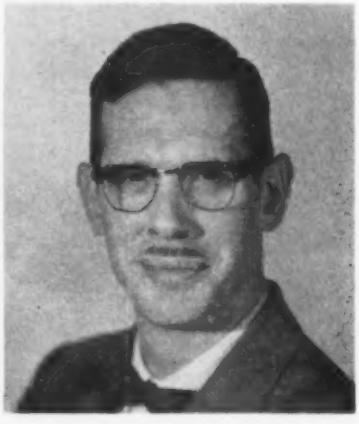
UTILITY GEARMOTOR (Foot Mounted Motor)



IN-LINE REDUCER

Detroit office; **B. R. Wise,** appointed sales engineer, Cincinnati office.

W. S. Kinne, appointed general manager, contract architectural metals, Kawneer Co., Niles, Mich.



Thomas Hollis, Jr., named general manager, Cutting Tool Div., Brown & Sharpe Mfg. Co., Providence, R. I.

A. L. Wilkie, appointed supervisor, sales planning, North American Van Lines, Inc., Fort Wayne, Ind.

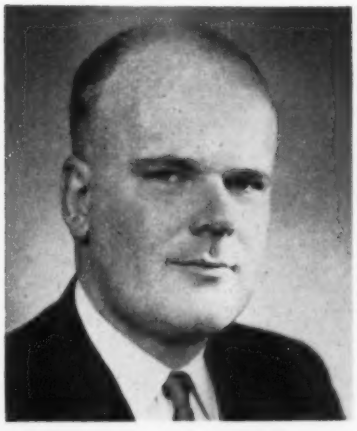
E. W. Hufnagle, appointed asst. manager, automotive sales, Glass Div., Pittsburgh Plate Glass Co., Detroit headquarters.

A. C. Sanders, appointed sales manager, merchant products, Kaiser Aluminum & Chemical Sales, Inc., Chicago.

C. G. Ward, named Shreveport district manager, Sheffield Div., Armco Steel Corp; **J. W. Delany, Jr.,** appointed district representative,

Dallas; **W. A. Keck,** named district representative, Tulsa, Okla.

Clayton Kiser, appointed sales engineer, Frederic B. Stevens Inc., Detroit.



W. L. Flinn, promoted staff director, defense activities, Vickers Inc.

B. E. Meyer, named manager, can machinery sales, E. W. Bliss Co., Canton, O.

L. F. Jesch, appointed mechanical engineer, Engineering Dept., Superior Tube Co., Norristown, Pa.

J. S. Lund, appointed purchasing agent, Lewis-Shepard Co., Watertown, Mass.

OBITUARIES

D. J. Giles, 67, senior vice president, Latrobe Steel Co.

F. X. Gilig, 57, executive assistant, Boiler Div., Babcock & Wilcox Co., New York.

New Materials Handling Ideas from Republic

SAVE SPACE, CUT COSTS, IMPROVE INVENTORY CONTROL

VALUABLE FLOOR SPACE is saved at Dresser Industries by special tiering feature of Republic Box and Skid Units. Tiering lugs are securely welded to boxes permitting stacking to any practical height.

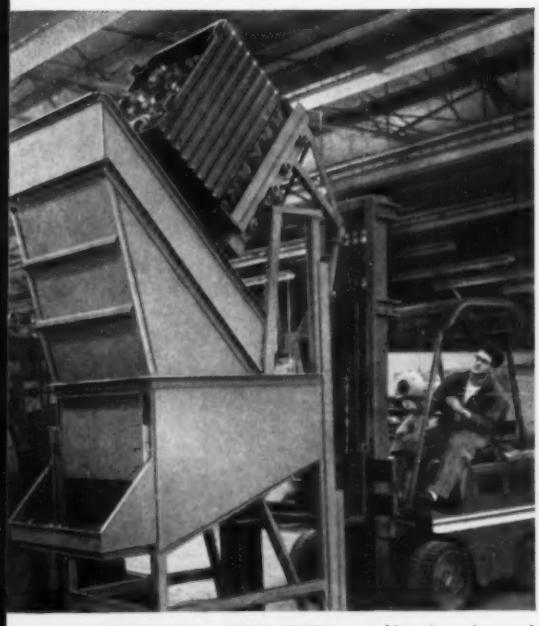
THESE REPUBLIC BOX AND SKID UNITS PERFORM FOUR JOBS, CUT HANDLING COSTS 10%. They were designed and fabricated by Republic's Pressed Steel Division for Dresser Industries' new pipe couplings and fittings plant at Wellsboro, Pennsylvania.

The multi-purpose units provide for: (1) Delivery of semi-finished parts to production stations for final machining. (2) Feeding of parts to machines in combination with hoppers built by Dresser's Ideco Division. (3) Receiving finished parts as they come off the machining line. (4) Storage of finished parts until ready for shipment.

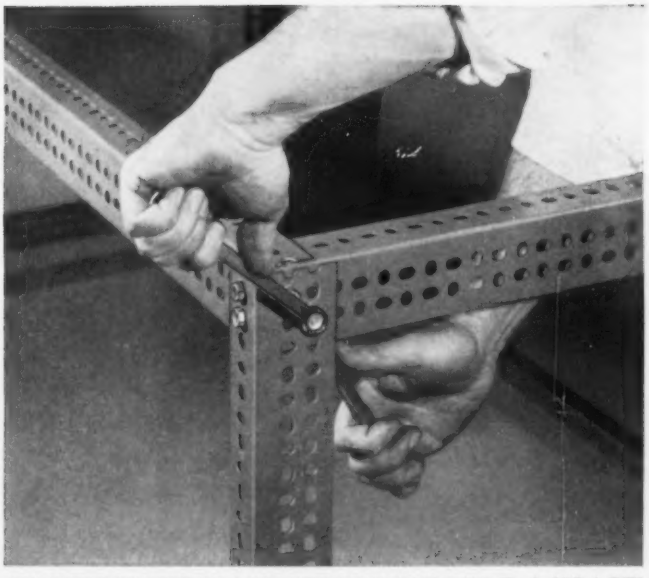
Plant management estimates a saving of 10% in handling costs since the Republic Box and Skid Units were placed in service. Also, it is possible to maintain an accurate inventory of both finished and semi-finished parts and to reduce storage space requirements.

Future savings in maintenance costs should be realized because corrugated-steel construction of the boxes and skids provides strength, assures long service life at lowest per-year-cost.

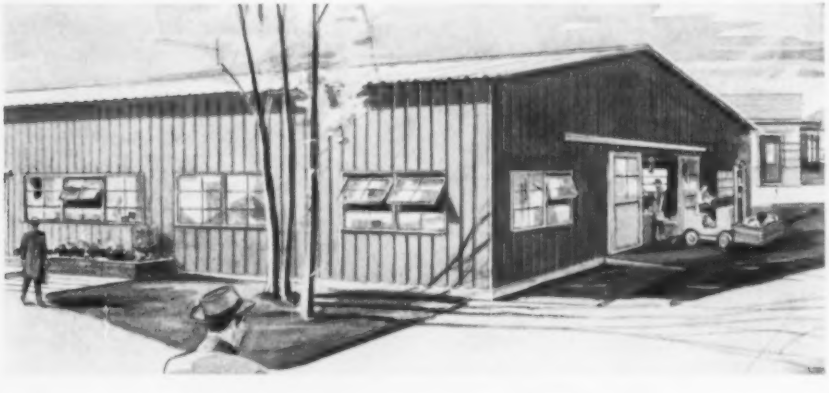
Now is the time to talk over your handling or storage problems with a Republic Engineer. A specially designed or a standard unit could cut your costs or simplify an operation. No obligation. Just contact your Republic Materials Handling Representative. Or mail the attached coupon.



CONTINUOUS MATERIAL FLOW to machines is a time and cost saving feature of Republic Box and Skid Units used in combination with Dresser-designed hoppers. Specially designed opening in front of box hooks and locks on hopper. Lift truck operator trips dumping mechanism with truck forks. Idle machine time is eliminated.



NEW SLOTTED CONSTRUCTION ANGLE MEETS ALL FRAMING NEEDS. That's BILD-A-FLEX, designed and engineered by Republic's Berger Division. It's versatile, durable, unlimited in application. Use it as "metal lumber". Plan your assembly, cut BILD-A-FLEX, join with bolts. Longitudinal and transverse slots on ¾-inch centers make adjustment easy. Bonderized and finished with baked enamel. Ten angles per bundle, light or heavy gage, 10- or 12-foot lengths, with hardware. Bundle stores in same space as one 2″ x 4″ piece of lumber. Send coupon for catalog loaded with ideas.



NEW "BUDGET BUILDINGS" by Republic's Truscon Steel Division brings the cost of additional storage space down low. It's a quality steel building with a tight, dense, galvanized coating that's more rust-resisting than ever. Simplified design permits fast on-site erection. No painting needed. Your "Budget Building" order will be handled fast from off-the-shelf stocks. Immediate delivery in widths of 32, 36, 44 and 48 feet . . . 12- and 14-foot heights. Lengths as long as you want them. Send coupon for complete details.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. C-5086
3104 EAST 45TH STREET • CLEVELAND 27, OHIO

☐ Have a Materials Handling Engineer call.

Send more information on:
☐ Materials Handling Equipment
☐ Truscon "Budget Buildings"
☐ BILD-A-FLEX Construction Angles

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 123.

Belt Finishing

Selection of offhand belt finishing materials and equipment can be simplified by an illustrated wall chart. It lists proper abrasives, grit, belt speed, lubricant and contact wheel for 16 popular metals and alloys. (Behr-Manning Co.)

For free copy circle No. 1 on postcard, p. 123

Steel Buildings

Steel buildings featuring a unique panel construction are described in a booklet. Types include shed roof, gable roof frameless, and gable roof rigid frame. More than 5000 sizes are available. (Armco Drainage & Metal Products, Inc.)

For free copy circle No. 2 on postcard, p. 123

Refractory Material

A data sheet describes a hydraulic setting, castable refractory which is economical and easy to install. It also has high refractoriness, ample hot strength, freedom from spalling, low shrinkage, the bulletin states. (Chas. Taylor Sons Co.)

For free copy circle No. 3 on postcard, p. 123

Switchgear

Major operating and maintenance innovations of the "most sweeping circuit breaker and switchgear advance in 13 years" are featured in a 20-page bulletin. Units range from 225 to 4000 amp. (I-T-E Circuit Breaker Co.)

For free copy circle No. 4 on postcard, p. 123

Shaft Couplings

Full-floating shaft couplings for maintenance-free power transmission are described in a 4-page bulletin. The couplings connect shafts that are spaced far apart. (Thomas Flexible Co.)

For free copy circle No. 5 on postcard, p. 123

Color Gage

Instruments for measuring color intensity, turbidity, or chemical concentration in a wide variety of process streams are described in a 4-page folder. Such colorimeters check the clarity of lubricating oils, other fluids. (Beckman Instruments, Inc.)

For free copy circle No. 6 on postcard, p. 123

Welding Units

Tooling and fixtures for all automatic welding processes appear in a 4-page bulletin. (Airline Welding Sales, Inc.)

For free copy circle No. 7 on postcard, p. 123

Freight Cart

Literature now available describes a new 4-wheel freight cart with a removable and replaceable hardwood deck. Carts come in capacities to 2000 lbs. (Lewis-Shepard Products, Inc.)

For free copy circle No. 8 on postcard, p. 123

Welding Electrodes

Faster welding of galvanized iron results when you use one maker's aluminum-bronze electrodes, says a folder. It states welding time can

drop 30 pct when using them. (Ampco Metal, Inc.)
For free copy circle No. 9 on postcard, p. 123

Ventilators

Advantages of using new low-silhouette power roof ventilators are discussed in an 8-page technical guide. (Ilg Electric Ventilating Co.)
For free copy circle No. 10 on postcard, p. 123

Lathe Slide Rest

Heavy-duty compound slide rests for jewelers-type instrument lathes are announced in a bulletin. Lead screw dials are 1-in. diam with a non-glare finish. (Louis Levin & Son, Inc.)
For free copy circle No. 11 on postcard, p. 123

Metals Research

Infrared and absorption spectroscopy facilities of a large laboratory are described in a bulletin. In addition, it covers: vacuum deposition of metallic films, zone refining and a new optics kit. (The Anderson Physical Laboratory.)
For free copy circle No. 12 on postcard, p. 123

Worm Gearing

An extensive line of worm gearing, supplied in individually matched sets, provides high load-carrying capacity on small center distances. Available with single or double extended shafts, the gears are detailed in a 16-page booklet. (Cone-Drive Gears Div., Michigan Tool Co.)
For free copy circle No. 13 on postcard, p. 123

Gas Turbine

Versatility of gas turbine combustion engines is discussed in a publication. The 32-page booklet points out that these units are small in size, light in weight, with many cost-cutting features. (General Electric Co.)
For free copy circle No. 14 on postcard, p. 123

Tool Grinding

Tool grinding departments can increase diamond wheel lives from 20 to 30 pct, states a 6-page publication. What's more, it states that

A Bucyrus-Erie 22-B crane handles scrap in a railroad yard at Worcester, Massachusetts.

BUCYRUS-ERIE 22-B CRANE MAKES SCRAP WORTH MORE —by cutting handling costs

You cut scrap handling costs three ways with a Bucyrus-Erie 22-B on the job.

1. *You handle extra scrap every day,* because the 22-B lets you coordinate crane movements to work smoothly, rapidly. With the independent power controlled lowering boom hoist you can change boom angle while hoisting, swinging or propelling to speed handling.

2. *You keep working* — hour after hour, week after week with a 22-B because it is built to stand the gaff.

3. *Your operating costs are held down.* One 22-B owner says, "It demands very little care, other than the usual lubrication . . . and for economical operation it can't be beat. Our repair bills are under fifty dollars for three full years." For more on how a 22-B crane can hold down *your* costs, make *your* scrap worth more, see your nearby Bucyrus-Erie distributor.

378E57

BUCYRUS ERIE

A Familiar Sign at Scenes of Progress

BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

they can get to 50 pct more tool grinds per hour, cutting costs in half. It's all done with a new grinder. (Wesson Co.)

For free copy circle No. 15 on postcard, p. 123

Lift Trucks

Gasoline, LP-gas and diesel fork lift trucks are detailed in a 4-page folder. They all feature 4000-lb load-carrying capacities at a 24-in. load center. (Towmotor Corp.)

For free copy circle No. 16 on postcard, p. 123

Grit Collection

Grit collecting and grit washing equipment is covered in a 28-page booklet. It describes: grit collectors, two grit washers, and a combination grit collector and mechanical screen setup. These collectors fit into waste disposal systems. (Link-Belt Co.)

For free copy circle No. 17 on postcard, p. 123

Overhead Doors

An 8-page brochure supplies details of a new type overhead door installation. It's said to pay for itself by reducing plant heat losses through its exceptional insulation properties. (Barber-Colman Co.)

For free copy circle No. 18 on postcard, p. 123

Gear Broachers

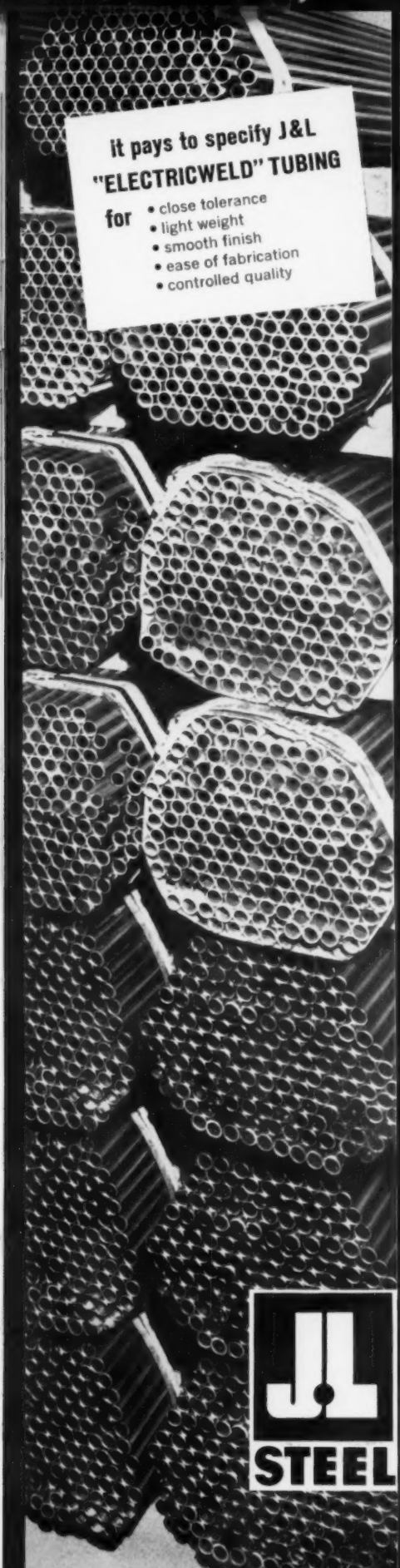
Containing 24 pages, a brochure describes one producer's gear making equipment and broaching tools. Covered are rotary shaving machines for working internal and external spur and helical gears up to 200-in. capacity. (National Broach & Machine Co.)

For free copy circle No. 19 on postcard, p. 123

Power Unit

Power units for many uses are outlined in an 8-page brochure. These units use gasoline, low-gravity fuel or natural gas. They come with or without reduction gearing, other accessories. Engines deliver 27.8 max bhp at 1800 rpm. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 20 on postcard, p. 123



"Electricweld tubing gives us greater strength with lighter weight" ...says SHOP SMITH manufacturer

The Magna Power Tool Corporation has been using J&L's light wall tubing for Shopsmith ways since 1947. These twin tube mounts make possible the versatility of these popular multi-purpose home workshops. "Electricweld" precision tubing is used for the rigid straightness to .003" tolerance on diameter. Performance has been so satisfactory that Magna Power Tool Corporation now has eight applications for "Electricweld" tubing.

"Electricweld" tubing may be the answer to *your* design and manufacturing problems. Your nearby J&L representative can recommend the exact shape, size, gage and grade of tubing for your products. He frequently can reduce your costs, improve your product. Call him today, or write for information based on your specific requirements to Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

Jones & Laughlin Steel Corporation

PITTSBURGH, PENNSYLVANIA

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Drilling, Tapping

Accessories for drilling and tapping units are described in a 12-page booklet. Designed to make better use of present machines, these accessories include: a lead screw tapping machine, a reversing motor tapping machine, a precision clutch-type tapping head, tee slots, a coolant system, cam feeds, table wear plates and more. (Edlund Machinery Co.)

For free copy circle No. 20 on postcard

Plant Location

Looking for a place to build a new plant? If so, you'll profit from gathering all the facts you can get on potential sites. Giving a strong case for locating in Pennsylvania is a new 10-page booklet. It points out advantages of setting up shop there, presenting its information in question-and-answer form. (Pennsylvania Dept. of Commerce.)

For free copy circle No. 21 on postcard

Wire Rope, Chain

A new catalog answers questions concerning drop forged fittings for wire rope and chain. It covers specifications, dimensions, rated capacities and weights on all products made by one supplier of such items. (Crosby-Laughlin Div., American Hoist & Derrick Co.)

For free copy circle No. 22 on postcard

Servosystems Analyzer

Worksheets to help you analyze your servosystems, or component test and design are available. These forms provide a standardized permanent record of the system or component under test. The worksheets can be duplicated by any normal means. (Servo Corp. of America).

For free copy circle No. 23 on postcard

Wire Rope Testing

Equipment for non-destructive testing of ferromagnetic wire rope is illustrated in a bulletin. This equipment detects flaws without hindering the production process. (Magnetic Analysis Corp.)

For free copy circle No. 24 on postcard

New Wing Nuts

New type zinc alloy wing nuts are outlined in a pair of specification sheets. One covers a capped wing nut; the other, a washer base wing nut. (Gries Reproducer Corp.)

For free copy circle No. 25 on postcard

Fork Lift

Operating and maintenance features of a new electric fork lift truck are given in a 6-page presentation. It points out how the truck has high maneuverability due to its rear-wheel drive and recessed mast between load wheels. Offered in 1000 to 2500-lb capacities with a 24-v electrical system, the truck will pass under 6-ft doorways with a 68-in. collapsed height. (Lewis-Shepard Products, Inc.)

For free copy circle No. 26 on postcard

Thermostats

Design information for adjustable and non-adjustable thermostats are given in a data sheet. (Norwalk Thermostat Co.)

For free copy circle No. 27 on postcard

Pumps

Self-priming centrifugal pumps are featured in a data sheet. It contains a convenient selection table covering 21 direct-connected and belt-driven models. (Barnes Mfg. Co.)

For free copy circle No. 28 on postcard

Creep Testing

A pocket-size creep load calculator determines pounds of weight needed on the weight pan when testing specimens in creep testers.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 2/13/58

Circle numbers for Free Technical Literature or Information on New Equipment:

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FIRST CLASS
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BUSINESS REPLY CARD
No postage necessary if mailed in the United States

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THE IRON AGE
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NEW YORK 14, N. Y.

BUSINESS REPLY CARD
No postage necessary if mailed in the United States

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THE IRON AGE
Post Office Box 77
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NEW YORK 14, N. Y.

FIRST CLASS
PERMIT No. 36
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FREE LITERATURE

The calculator quickly and easily gives the accurate figure needed to test both round and square test specimens. Free calculators are available. (Arcweld Mfg. Co.)

For free copy circle No. 29 on postcard

Fast Presses

Two-point, straight side, automatic presses are reported on in a 24-page booklet. For high-production, these presses are complete with advanced automatic coil feed, plus latest press-mounted controls and devices. (Niagara Machine & Tool Works).

For free copy circle No. 30 on postcard

Blending System

Blending of pulverized materials via a new system is covered in a 4-page bulletin. It shows how dry materials are homogenized by combining quadrant blending and pulsated aeration. (Fuller Co.)

For free copy circle No. 31 on postcard

Overhead Handlers

Overhead handling equipment is pictured and described in an 8-page catalog. All basic standard equipment is used in 90 pct of cases shown. (American Monorail Co.)

For free copy circle No. 32 on postcard

Electric Motors

Totally protected, 1- to 125-hp ac motors are discussed in a 4-page bulletin. (Reliance Electric & Engineering Co.)

For free copy circle No. 33 on postcard

Mechanical Presses

Bottom drive mechanical presses are reviewed in a 32-page catalog. Included are typical applications of single, double and triple-action presses. (Clearing Machine Corp.)

For free copy circle No. 34 on postcard

Tractor Maintenance

Most owners and operators realize the importance of maintenance. A new 24-page guide gives hints on how to keep machines running better and longer. (Caterpillar Tractor Co.)

For free copy circle No. 35 on postcard

Special Fasteners

Special fasteners for easy installation, improved product appearance are covered in an 8-page catalog. (Simmons Fastener Corp.)

For free copy circle No. 36 on postcard

Industrial TV

Industrial television setups especially for use by metalworking firms are featured in a folder. (Radio Corp. of America).

For free copy circle No. 37 on postcard

Heating Units

Industrial electric heating units and devices are listed in a 24-page catalog. Strip heaters, oven heaters, immersion heaters, bolt heaters, and industrial hot plates are included. Heating problems and solutions are discussed. (Westinghouse Electric Corp.)

For free copy circle No. 38 on postcard

Electrical Controls

Simple all-purpose electrical controls appearing in a 12-page bulletin are suitable for use with virtually any detectable variable. Controls are built around contact meter-relays of almost infinitely variable sensitivities. (Assembly Products, Inc.)

For free copy circle No. 39 on postcard

Electric Substations

Electrical substation structures constructed of aluminum are studied in a 48-page booklet. (Kaiser Aluminum & Chemical Sales, Inc.)

For free copy circle No. 40 on postcard

Wire Rope

To save time and cut costs, it's no longer necessary to make up cable assemblies by hand with splicing, clipping, etc. So states a firm's new literature. Instead, it points out that prefabricated wire rope assemblies are available to do the job. (The MacWhyte Co.)

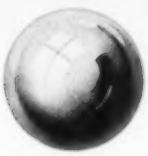
For free copy circle No. 41 on postcard

Sterling COMMERCIAL STEEL BALL CORPORATION

KEYSTONE XL WIRE STUDY

20% longer die life...

5% greater production of steel balls



FROM KEYSTONE XL WIRE *flowability* IS THE SECRET

That's right... 20% longer die life and 5% greater production... and all because of Keystone "XL" Wire's exceptional flowability.

This sums up the experience of Sterling Commercial Steel Ball Corporation, Sterling, Illinois. Sterling has cold headed steel balls by the millions – from ⅛ inch to ¾ inch in diameter – since production was initiated ten years ago. Sterling's steel balls are used primarily in conveyors, castors, office furniture, etc.

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FERROUS CASTINGS

Every year American industry spends upwards of $4 billion for some 17 million tons of iron and steel castings. How much value is received for this huge outlay doesn't rest with the foundry alone; a lot depends on the castings know-how of people who design, specify, buy and use the foundry's product.

ON THE COVER: The man who buys castings at Reliance Electric and Engineering Co., Ashtabula, O. Morley Hitchcock, manager of purchasing, discusses casting specifications with a foundry salesman (back to camera).

Non-users, too, should know something of the hidden values in castings. Even where other methods seem an obvious choice, it pays to fully appraise a part in terms of every available means.

Here, for both groups, is a quick course in castings: a run-down on advantages for non-users, and ways in which present users can get better castings at lower cost.

Why to Consider Castings

Deciding how a part should be made depends on balancing a number of factors. But in the end, it boils down to how well it'll do the job and what it will cost.

The two actually go hand-in-hand; total cost takes in service life as well as indirect labor.

■ It's been said that the casting process is one of the most versatile production methods available to industry. Basically, it involves merely making an impression or cavity of the desired shape in a mass of sand, then filling the form with molten metal. It's simple and direct, a quick way to translate an idea into a finished product.

The casting process converts molten metal into the desired shape without regard for complexity or size. Sometimes it's the only practical way to produce a highly complicated part, whether the piece weighs a few ounces or more than 200 tons, and whether the end use calls for a few units or many thousands.

To spell out all the benefits of iron and steel castings in terms of each particular use to which they're being put would be virtually impossible. Broadly, however, their advantages can be divided into two main groups—functional and economic.

Heading the list from a functional standpoint is freedom of design. The casting process permits undercuts, curved reflex contours and intricate internal passages—in fact, the only real limitation is ability to produce the shape needed in the wood, plaster or metal pattern used for making molds.

Forms In One Step—Casting design doesn't depend on subsequent forming; in a single step, it puts metal where it'll do the most good and omits it where it isn't needed. Reinforcing ribs, supporting webs and the like are formed in one simple operation; at the same time, unstressed sections are cored out to effect savings in weight.

In place of assembling a number of preformed pieces, the casting process can be used to develop a complex part in a unit. This simplifies alignment, eliminates joints that might result in leaks and reduces the likelihood of assembly errors.

Moreover, castings make for an

FEWER PIECES: Castings simplify assembly because several parts are formed as a complete unit.

attractive product. It's a happy coincidence that the smooth contours which often promote sales appeal usually coincide with conditions that make for easiest metal flow in casting. The same streamlining generally prevents stress concentration as the casting solidifies and minimizes residual stresses in the final product.

And if the textured finish of a casting isn't enough, it can be further improved by many forms of finish (the common cast-iron bathtub is a good example.)

In Terms of Money—Economic advantages go back first to the benefits of producing a complex part as a single unit. Here there are all sorts of savings. The most obvious is the fact that fewer pieces have to be put together, so direct assembly costs are reduced. This is reflected all the way down the line, from time-study, time-keeping and records work to indirect labor, supervisory costs, and down-time for want of certain parts.

Another big area of savings is in machining costs. According to the American Society of Tool Engineers, more than 15 million tons of metal are whittled away into chips every year at a cost of more than 10 billion dollars. Certainly, much of this can't be avoided; but at the same time, a good bit of it is eliminated by casting parts to shape and close to final tolerances.

A lot of machining time—and cost—goes into making holes, interior passages and pockets. Cored castings will cut it down. And because metal is placed only where it's actually needed, important reductions in material cost often result.

Further Savings—Generally speaking, development and tooling costs for castings are somewhat lower than those of other fabricating methods. If only one or two pieces are needed, the pattern can be made of cheap materials like modeling clay, wax or plaster. In fact, simple molds are sometimes made right in the foundry floor without any pattern whatsoever.

While the part is advancing through developmental stages, wood patterns are easily and inexpensively altered to accommodate changes in design. Wood is the usual choice for making less than a thousand castings. For high production runs, patterns must be more durable and so are made of metal.

Less tangible and often overlooked in determining total cost is the factor of engineering time. Complicated parts can be designed as a single casting; one drawing often takes the place of dozens, eliminating many hours of detailing and preparation of instructions for assembling components.

Weigh Performance and Cost in Choosing the Right Metal

There's a cast ferrous alloy for almost every combination of properties and conditions.

In some cases the choice is clear-cut, based on one or two special requirements; most of the time it takes a fine hand and thorough knowledge of what each type will do and cost.

■ For years foundrymen and metallurgists have been trying to find short, accurate ways to define the various classes of cast ferrous metals. So far, these efforts have met with only moderate success.

There are, of course, two main groups: cast iron and cast steel. But even here the dividing line is somewhat vague; and a recent survey showed surprising numbers of engineers firmly believe there's a distinct middle group called semi-steel.

Rule-of-Thumb—It's a common practice to consider iron-carbon mixtures with up to 1.70 pct C (all of it in combined form) as steel, and anything with higher carbon content (some of it in a free form) as cast iron. As a rule-of-thumb this is adequate, but there are exceptions. Certain cast steels such as those used in making steel rolls contain more than 1.70 pct C and have no graphite; others with less than 1.70 pct C do contain graphite.

As for semi-steel—well, there's no such thing. The term came into being several decades ago in connection with iron made by including some steel in the melting charge. But despite a fairly popular notion to the contrary, metal produced in this way has none of the characteristics of steel—it's strictly a cast iron.

High test cast iron is another term that's obsolete and should be discouraged. Its supposed to designate

TABLE I — Properties of Cast Ferrous Metals

Mechanical Properties:	Gray Iron	Malleable Iron	Nodular Iron	Steel
Tensile strength, 1000 psi	20–80	48–120	60–160	60–200
Tensile yield strength, 1000 psi	20–80	30–95	40–135	30–170
Compressive strength, 1000 psi	3–5 x T. S.	48–120	40–135	60–200
Shear strength, psi	1.0–1.6 x T. S.	0.90 x T. S.	0.90 x T. S.	
Elongation in 2 in., pct	3–0	26–1	26–1	35–5
Reduction of area, pct	0	23–0	30–0	65–5
Hardness, Bhn	135–350+	125–285+	140–330+	130–750[a]
Maximum hardness, RC	60–64	60–64	60–64	65–66
Modulus of elasticity, 10^{-6} psi	12–22	25	24–26	30
Endurance limit, psi	0.4–0.6 x T. S.	0.4–0.6 x T. S.	0.4–0.55 x T. S.	0.4–0.5 x T. S.
Impact resistance, ft-lb	Low[b]	1–20	1–20	3–65
Physical Properties:				
Density, g/cc at 68°F	6.96–7.35	7.15–7.60	7.15	7.81–7.86
Density, lb/cu in. at 68°F	0.25–0.266	0.258–0.274	0.25–0.28	0.282–0.284
Coefficient of thermal expansion, 10^{-6} in./in., °F	5.8 (32–212°F)	6.6 (70–750°F)	7.5 (70–1100°F)	6.1–7.1 (90–415°F)
Thermal conductivity at 68°F, Btu/sq ft/sec/in./°F	0.056–0.113	0.111–0.122	0.045–0.090	0.096–0.113
Electrical Resistivity at 68°F, microhm-cm	117–119	28.5–34.4	55–70	14–17
Melting range, °F	2000–2400	2000–2550	2000–2400	2600–2775
Normal heat treating temperatures, °F				
Stress relief	800–1250	800–1250	800–1250	800–1250
Anneal	1500–1800	1600–1750	1600–1750	1650–1700
Harden	1500–1700	1500–1650	1500–1700	1500–1650
Temper	350–1100	350–1200	350–1200	800–1350
Normalize	1500–1800		1600–1700	1600–1700
Other properties (relative)[c]:				
Machinability	G	G	G	G[d]
Damping capacity	E (about 10 times that of steel)	Roughly related inversely to modulus of elasticity		
Wear resistance, lubricated sliding friction	E	Standard, G; Pearlitic, E	G to E	G (improved by heat treat)
Suitability as a bearing material	P to E	Standard, P; Pearlitic, P to G	P to E	Less so than cast irons
Abrasive wear	E (for special alloys)	G	G (with surface hardening treatment)	E (for special alloys)
Notch sensitivity	Depends on hardness. Cast ferrous alloys are fairly comparable on basis of unnotched to notched bar in fatigue test. Cast steel is less sensitive than wrought steel.			
Section sensitivity[e]	Yes	No	As cast, Yes Annealed, No	To a limited extent
Can be joined by:				
Welding	Yes, with special precautions			Yes
Brazing	Yes	Yes	Yes	Yes
Soldering	Yes	Yes	Yes	Yes
Fluidity	E	G	E	Less than cast irons
Susceptible to hot tearing	No	Yes	No	Yes
Pressure tight	Yes	Yes	Yes	Yes
Properties altered by heat treatment	Yes	Yes; 100 pct heat treated	Yes	Yes

[a] Surface hardnesses up to 900 Vickers.
[b] 20 to 80 ft-lb on 1.125-in. diam round bars, unnotched, machined from halves of 1.20-in. diam transverse bars and broken on 6-in. supports.
[c] E—excellent, G—good, P—poor.
[d] Less machinable than other cast ferrous alloys but about equal to comparable wrought steels.
[e] Variation in properties of a casting depending on section size and cooling rate.

a gray iron having substantially higher tensile strength than ordinary cast iron, and probably started as an effort to tone down the semi-steel approach.

Use Standard Specs — Today, most cast metals are classified on the basis of properties rather than in terms of generic type or chemistry. Standard specifications have been set up by a number of technical societies, associations and government agencies.

Although a great many types of cast iron are available commercially, they fall into six general classes. These are gray iron, malleable iron, ductile (nodular) iron, white iron, chilled iron, and alloy iron.

Gray Cast Iron

The largest single class of cast irons, gray iron regularly accounts for 75 to 80 pct of total metallic castings production in the United States. Last year, American industry used something like 14 million tons of this versatile material.

Gray iron is characterized by the fact that much of its carbon is present in the form of graphite flakes. Irons of this type are usually classed according to their ultimate tensile strengths. While gray iron is primarily for structural purposes, it finds use in many applications which involve moderate corrosion, heat resistance or wear.

Gray iron has good strength and fatigue resistance, low notch sensitivity, high damping capacity and good wear resistance. Because of its high fluidity in the molten state, gray iron is a natural for intricate parts and compartively thin-walled castings.

Offers Low Shrinkage—More important from a design viewpoint is its low solidification shrinkage. Depending on composition, gray iron's shrinkage varies from 0 to 1.9 pct; its contraction from solidification down to room temperature is also about half that of most other cast metals.

Gray iron is one of the easier metals to machine; castings can often be roughed and finished in just one cut. It also offers response to heat treatment about equal to that of high carbon steel. And finally, properties of gray iron can be developed and modified by alloying with elements such as nickel, chromium, copper, molybdenum, and vanadium.

Malleable Iron

Malleability has been defined as the property of being permanently deformed by compression without rupture. In plain English it means that malleable iron castings can be bent, twisted, pounded and otherwise abused without having them break.

Standard malleable iron is an alloy consisting mostly of iron and carbon—the iron forming a ferrite matrix in which are dispersed nodules of free temper carbon. As cast, it's a hard, brittle white iron which is then rendered tough and ductile by a heat-conversion process (actually, an anneal).

The other basic type, pearlitic malleable iron, is made from about the same compositions and in roughly the same way. Where pearlitic malleables differ is in the fact that some of the carbon is as the name implies, in a combined form.

Seven Grades Available—ASTM specifications cover two grades of standard malleable iron and five grades of pearlitic.

Standard grades are tough and impact resistant; they offer excellent machinability, are easily castable, and adapt to quantity production at low cost. Pearlitic grades furnish higher strength, hardness and wear resistance, but at some sacrifice of ductility and shock resistance. Both respond well to heat treatment.

Ductile (Nodular) Iron

In many respects akin to both gray and malleable iron, it's known by several names — nodular cast iron, ductile iron, spherulitic graphite cast iron, and SG iron. All four terms are used to designate this relative newcomer, a high strength iron that's ductile as-cast.

Ductile (nodular) iron consists of graphite spherulites dispersed in a metallic matrix. It's produced by slight modification in analysis of the iron—essentially, ladle additions of cerium or magnesium to make the graphite form into nodules.

Since graphite in the form of spherulites has little influence on mechanical properties of a casting, the properties of ductile iron depend mostly on the kind of matrix which surrounds the nodules.

Wide Property Range—Structure of the matrix can be varied by foundry practice and/or heat treatment, so a broad range of properties is possible.

Ductile iron is strong—generally more so than either gray iron or malleable. It offers toughness, ductility, machinability and excellent response to heat treatment. In fact, its best qualities are brought out when ductile iron is annealed, normalized, stress-relieved, quenched and tempered, austempered, or surface-hardened by induction or flame.

White Cast Iron

White iron castings are made by adjusting chemical analysis and solidification rate of the metal so that virtually all of the carbon exists in the combined form as cementite. The result is a very hard, wear-resistant iron with high compressive strength—but one that's low in impact resistance and machineability. It gets its name from the white, bright appearance of a fractured surface.

Higher carbon contents give hardness upwards of 500 Bhn, but as carbon goes up, tensiles fall off. Impact resistance may be less than one-third that of gray iron, so uses are limited to applications involving little shock.

Addition of alloying elements improves the properties of white iron for many applications. Also, me-

LESS WORK: Parts cast close to final size and shape usually need little machining and finishing.

chanical properties can be changed considerably by heat treatment.

Chilled Cast Iron

Basically, chilled iron is a composite of gray and white irons. It's made by adjusting chemical analysis, casting against metal or graphite chills embedded in sand molds, or casting into metal molds; metal near the chill surfaces will solidify rapidly and become white iron, while metal away from the chill becomes gray. Mottled iron, in which white and gray spots alternate, may be formed in the zone between the white and gray iron areas.

Sometimes the technique is used on only one section of a casting where exceptional wear resistance is needed, leaving the rest of the piece with lower hardness and good machinability. In other cases chilled iron is used as a hard layer over the outside of a casting in place of making the entire piece of white iron; the softer gray iron interior provides considerable cushioning under shock loads.

Alloy Irons

Here again there are two broad classes: low-alloy materials (commonly called just plain "alloy iron"), and high-alloy irons.

Low-alloy irons are basically gray or white iron in which alloying elements are used only to modify or intensify normal properties—they keep the same general characteristics as the unalloyed forms. Most of the time castings made of these materials are specified on the basis of desired properties, leaving use of alloys to the foundryman's discretion.

High-alloy irons are materials with unique properties of their own; these are specified by tradename or on the basis of chemical analysis. This group is further subdivided into corrosion-resistant cast irons and heat-resistant types.

Four alloying elements—silicon, nickel, chromium, and copper—find widest use, either singly or in combinations, for improving corrosion-resistance of cast iron. Silicon is normally present in all cast irons, but in amounts greater than about 3 pct is considered an alloying element. It promotes formation of a protective surface film under oxidizing conditions.

Nickel improves resistance to reducing acids and caustic alkalis. Chromium helps form a protective oxide and improves resistance to oxidizing acids. Copper improves resistance to sulphuric acid to a lesser extent. Molybdenum also finds some use, in combination with high silicon.

For High Temperatures—Heat resistance might better be termed high-temperature characteristics. It involves a number of factors, including expansion and contraction, scaling, permanent growth, and gas penetration.

Heat-resistant cast irons are divided into five general classes according to the main alloying elements they contain.

Silicon and chromium increase cast iron's resistance to heavy scaling by forming a light oxide on the surface that's impervious to oxidizing atmospheres. At the same time, both of these elements reduce toughness and thermal shock resistance. Nickel, on the other hand, makes the alloy tougher, and both nickel and molybdenum increase high-temperature strength. Aluminum reduces growth and scaling.

Special-Purpose Irons

A group of high-nickel cast irons has been developed for uses requiring controlled expansion or special magnetic and electrical properties. The low-expansion alloy can also be made with a controlled high expansivity for matching other metals.

Meehanite Metal—An increasingly important class of engineering materials, Meehanite in a strict sense is neither iron nor steel; it combines some of the properties of each and so bridges the gap between the two.

Meehanite castings offer true elastic properties, high tensile and compressive strength, toughness and resilience, excellent wear resistance, high damping capacity, self-lubrication qualties and free machinability. They can also be heat treated.

There are 26 types, divided according to use into four classes. These are: general engineering, heat resisting, wear resistant, and corrosion resistant.

Cast Steel

Commercial steel castings are divided into five classes: Low-carbon steels (carbon content below 0.20 pct), medium-carbon steels (between 0.20 and 0.50 pct C), high-carbon steels (above 0.50 pct C), low-alloy steels (alloy content totaling less than 8 pct), and high-alloy steels (alloy content totaling more than 8 pct).

Of these, medium-carbon steels account for the bulk of steel casting output (which last year totaled about 1.8 million tons) and make up the so-called regular-grade product.

Castings with carbon contents below 0.20 pct and above 0.50 pct are commonly termed special carbon steel castings.

Widest Property Range—Probably the greatest advantage of cast steel is its range of properties. By varying alloy content of the steel itself, heat-treating the casting, or both, a wider range of properties can be obtained in steel castings than in any other castable metal.

Steel castings are tough, durable, ductile and malleable. They can be made hard and wear resistant, or specially compounded for high resistance to heat and corrosion. In short, cast steel offers about the same traits found in its wrought counterpart. Its properties are, however, uniform in all directions. Steel castings are easily machined and readily welded for use in composite structures.

High-Alloy Steels — This class takes in the so-called stainless cast steels, but generally refers to all low-carbon high-alloy ferrous metals used for continuous service at high temperatures or under corrosive conditions.

The terms "corrosion resistant" and "heat resistant" as applied to high alloy castings are defined arbitrarily by operating temperature: the former refers to alloys used to resist corrosive attack at temperatures less than 1200°F, while the latter covers alloys used at metal temperatures above this mark.

Four Kinds—Heat and corrosion resistant steel-like cast alloys are of four main types: iron-chromium, iron-chromium-nickel, iron-nickel-chromium, and nickel-iron-chromium. In each of these groups the first-named element predominates.

With the exception of iron-chromium alloys having between 8 and 14 pct Cr, alloy foundrymen consider it wrong to classify the high alloy compositions as steel. Most of these materials are non-hardenable, so they depend on composition rather than heat treatment for their mechanical properties.

The Alloy Casting Institute has set up 16 standard grades of corrosion resistant alloys and 12 standard grades of heat resistant types.

Design: Key to Quality, Savings

High unit cost, rejects and machining problems often are born on the drawing board.

Service requirements rightly have priority over molding problems; but there are lots of ways in which designers can compromise toward good foundry practice.

■ Design is the largest single area where costs are influenced—both for better and for worse. Where castings are concerned, design goes well beyond merely creating a strong, functional and attractive product. To assure a sound yet economical cast part, the designer has to consider how molten metal flows (or sometimes doesn't flow), as well as how design affects foundry practice and vice versa.

First, the various steps in design should be approached in orderly sequence, somewhat as follows: Establish service conditions; determine critical requirements such as static and dynamic forces; lay out the structural skeleton for best arrangement of functions, then consider effects of the first two steps on this layout; make a tentative choice

TABLE II How the Principal Molding Methods Affect Design

Process	Green Sand	Dry Sand	Floor and Pit Molding	Shell Molding	Investment Casting	Permanent Mold
Number of Castings, Minimum	One	One	One	500 or more	500 to 5000	1000 to 5000
Maximum	Pattern life limited	Core box life limited	Pattern life limited	Pattern life limited	Limited to pattern life	Mold life limited; 1000 to 100,000
Type of Patterns	Simple wood patterns, plastic, or machined metal patterns and core boxes	Core boxes and driers	Usually wood patterns	Machined metal patterns and core boxes	Metal die, for casting wax patterns	Machined mold
Casting Alloys*	1, 2, 3, 4	1, 2, 3, 4	1, 3, 4	1, 2, 3, 4	1, 3, 4	1
Casting size (weight)	One oz to several tons	One oz to several hundred lb	Large, any weight	One oz to several hundred lb. Shell usually small, under 25 lb	Less than one oz to several hundred lb, usually under 10 lb	Several oz to about 50 lb; sometimes up to about 500 lb
Casting intricacy: External mold surface	Green sand limited by pattern drawing; no limit with cores	No limit	No limit with cores	Limited by pattern drawing; no limit with cores	No limit	Limited by casting ejection
Internal-cored surfaces	No limit	No limit	No limit	No limit	No limit	Simple with metal cores, no limit with sand cores
Section thickness, in. Minimum	1/8 in.—gray irons 1/8 in.—malleable irons	Same as green sand	Same as green sand	Less than green sand	0.025 to 0.050 in. depending on surface area of section	3/16 in.
Maximum	1/4 to 1/2 in.—steel	———	No limit	———	Normally 0.500 in., may be more in some cases	2.0 in.
Minimum cored hole diameter, in.	1/4 in.	3/16 to 1/4 in.	1/4 in.	1/8 to 1/4 in.	0.020 to 0.050 in.	3/16 to 1/4 in.
Tolerances, plus or minus average	3/64 in./ft—gray irons. 1/32 in./ft—malleable irons. 1/16 in./ft—steel	Similar to or better than green sand	Same as green sand	0.005 in./in., and as little as 0.003 in. total on some dimensions	0.004 in./in., average of 0.005 in./in. on dimensions over one inch	0.015 in./in. for first in. Add 0.001 to 0.002 for each additional in. May be reduced to ± 0.010 in. total in some castings
Across parting line	Included in above values	———	———	Add 0.005 to 0.015 in. to above	Add 0.001 in./in. to above	Add 0.010 to 0.020 to above
Surface finish, Micro-inches, RMS	250–1000	Somewhat better than green sand	Same as green sand	50 to 250	10 to 85	100 to 250

*1—Gray and Ductile Iron.
2—Malleable Iron.
3—Steel.
4—Heat and Corrosion Resistant Alloys.

of metal; check stress and deflection, if these are critical, and evaluate the tentative selection; consider general appearance from the point of utility and sales appeal; and finally, talk it over with the foundryman to determine possible molding and casting problems, casting quality, cost, and delivery, BEFORE freezing the design and making patterns.

Important Point — Talking it over with the foundryman is highly important where costs are concerned. It's a rare case where he can't make suggestions that will simplify foundry practice and cut down on labor or material.

While designers aren't expected to know all the ins and outs of the founder's art, a passing acquaintance with casting methods is helpful—at least to the extent of knowing what limitations they place on design. Table II summarizes the more popular ones.

Basic Principles—Each job, and especially a more complicated one, is likely to introduce special problems. There are further aggravated by differences in behavior of the various cast metals. But a number of basic design principles apply to all castings. Some of the more important ones are shown in Figs. 1 to 3.

Foremost is the desirability of keeping metal thickness as uniform throughout as strength and function will allow. If thickness must be varied, it should be done with fillets and tapers as in Fig. 1. In fact, fillets are the general rule throughout a casting in order to smooth metal flow and reduce stress concentrations.

Avoid having thick sections isolated by thin ones. Thin sections solidify faster and cut off the supply of molten metal needed to fill the shrinkage cavity as the heavy section contracts. Wherever possible, keep thin sections where they'll be first to fill so heavier sections can be fed by risers.

Eliminate Hot Spots — So-called hot spots develop where sections join in such a way as to create a larger mass of metal that cools more slowly than surrounding parts of the casting. Shrinkage cavities, cracks and internal stresses are likely to result.

Possible hot spots can be located and minimized by using the inscribed-circle technique shown in Fig. 2.

Hard spots in gray iron and property changes in other alloys may result when sections are too thin. This is because molten metal might freeze so quickly in a very thin section that the mold cavity doesn't have a chance to fill completely. Recommended minimum section thickness for the main types of ferrous metals are listed in Table II.

Metal costs money, so it's a constant temptation to aim always

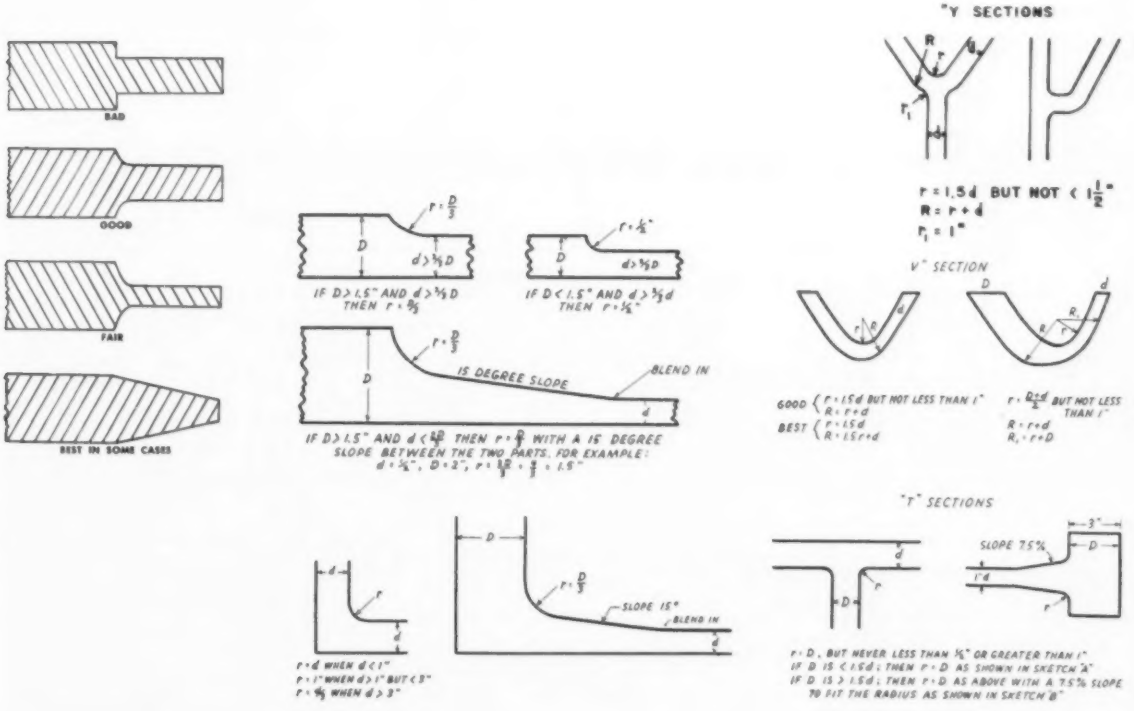


FIG. 1: From the foundryman's viewpoint, this is how various kinds of sections should be designed to assure sound, low-cost castings. Any major departures from these basic rules should be discussed with the foundry.

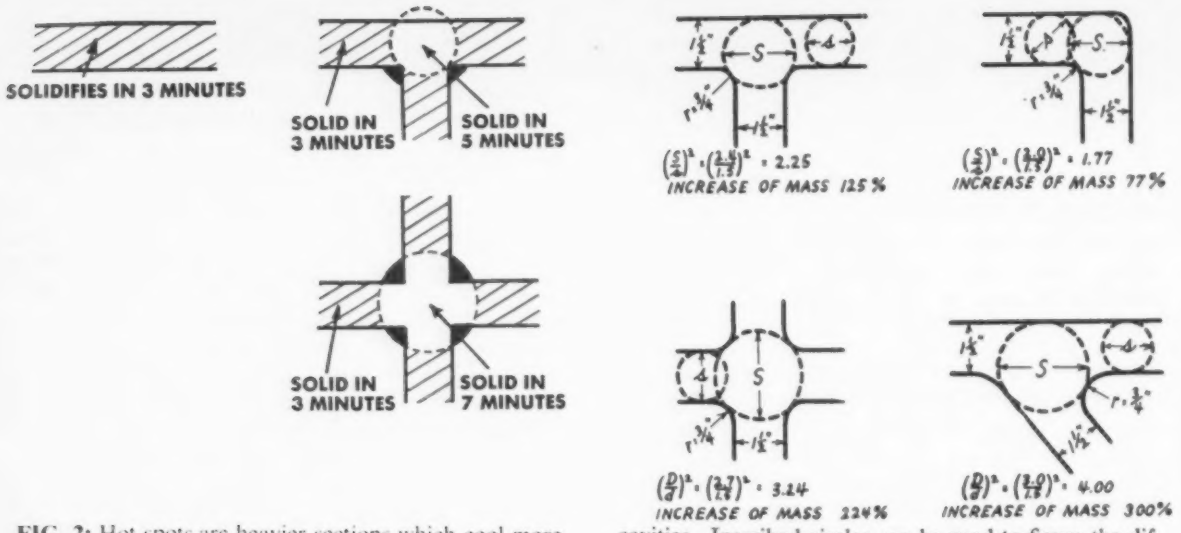


FIG. 2: Hot spots are heavier sections which cool more slowly than adjacent metal, often result in shrinkage cavities. Inscribed circles can be used to figure the difference in mass and design to reduce it.

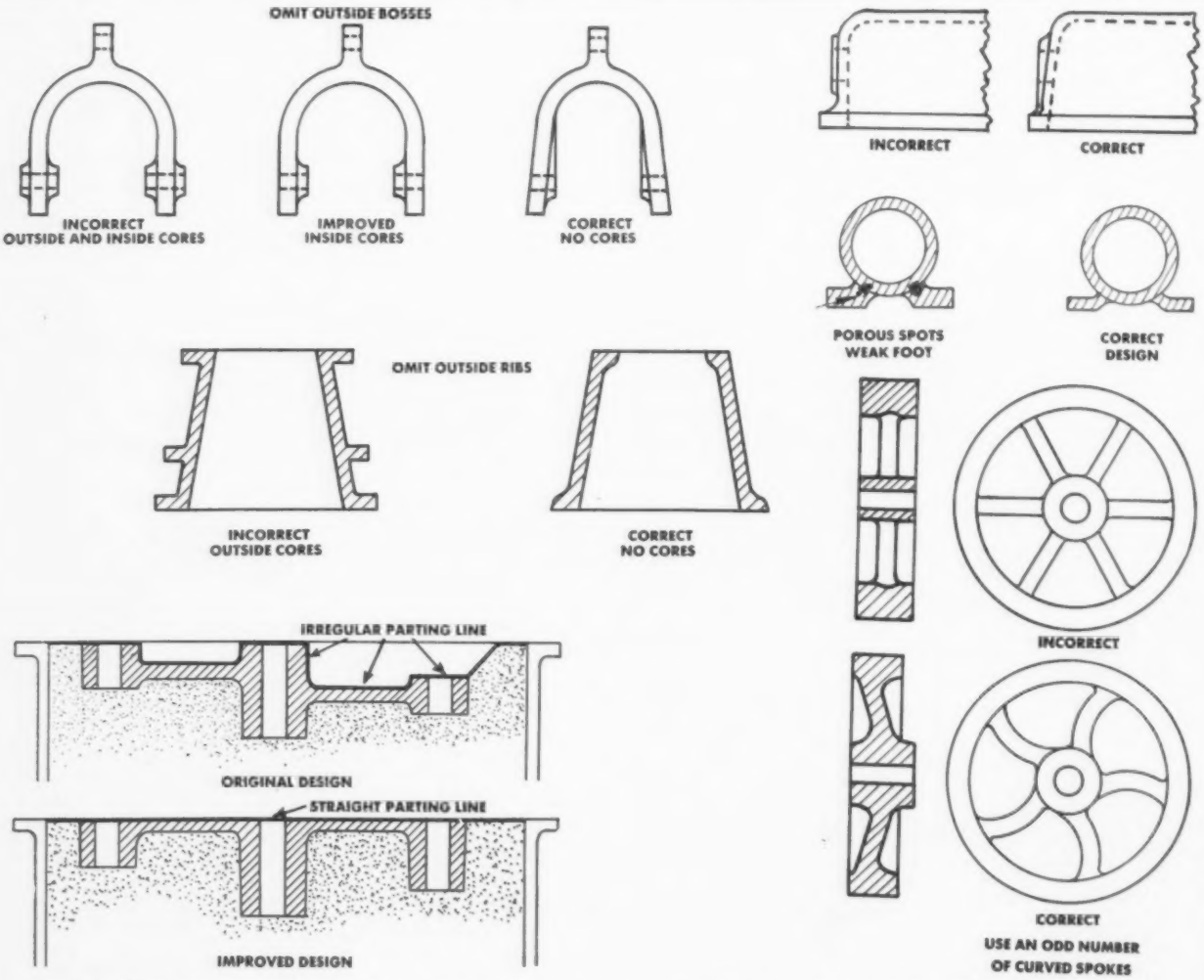


FIG. 3: Cores are expensive, so design to simplfy or eliminate them. A straight parting line makes molding easier, and as a result less costly. Sketch at upper right demonstrates what's meant by draft.

for minimum section thickness and close dimensional tolerances. Usually, however, this proves more expensive than using a good bit more metal. Pattern complexity, molding problems and casting difficulties—all of which have a big bearing on rejects and final cost—generally increase as section thickness is reduced.

Simplify Coring—Dry sand cores are another item of considerable expense. Wherever possible, design to eliminate or simplify them. The ideal design from a cost standpoint is one which can be molded in green sand and leave its own green sand core, if a core is needed. Since this isn't always feasible, keep looking for ways to hold dry sand cores at a minimum.

Deep pockets and recesses make molding difficult and so should be avoided. Like internal cored cavities and passages, they're also difficult to clean, and cleaning is another item that runs costs up. Where deep pockets are necessary, make them as large as possible, round out all inside corners and provide plenty of draft.

On the subject of draft, the taper necessary on all vertical faces to permit withdrawal of pattern from mold, keep it as generous as the part's function allows. The sketch in Fig. 3 shows how.

Loose or gated patterns molded by hand should have at least one degree of draft; for machine molding, where the pattern is drawn from the sand mechanically, as little as one-half degree will do. But there are exceptions, so it's wise to discuss the matter with the patternmaker and foundry.

Small holes should be drilled, not cored—especially those which will require finished surfaces. Here again, there's an exception; it's often wiser to core even a small hole when it will equalize section thickness on a boss. A general guide for minimum size of cored holes is also provided in Table II.

About Patterns — For the most part, patterns are obtained from companies which specialize in patternmaking. Some foundries have complete pattern shops, but many are equipped only for rigging and maintaining patterns or making minor changes.

Patterns can be made in a number of ways and from a variety of materials. Their cost can vary several hundred percent, depending on type, material, quality of workmanship, accuracy, and finish.

Dimensional Allowances—It's in the pattern stage that dimensional allowances come into play. Because metal contracts as it cools, patterns have to be made slightly larger to obtain a casting of the desired size.

When one part of a casting cools faster than another, the casting may distort. This can often be corrected by special foundry techniques or heat treatment; but in some cases the pattern is intentionally distorted or "faked" so the casting will be true. This practice is called distortion allowance.

Machine-finish allowance is the amount of extra metal that's left on the surface of a casting so it can be finished to accurate size by machining. The amount of this allowance depends on size and type of casting, the kind of surface how it will be machined, and how accurately the casting can be made.

Are You Preparing to Purchase?

Buying castings takes a special kind of ability. The buyer should understand castings and how they're made, as well as know what kinds of jobs can be handled best by a particular foundry.

A big part of his job is insuring good liaison between engineering and founder.

■ The purchase of castings isn't usually a simple matter of transfering pattern numbers and quantity desired from engineering's bill of materials to a purchase order. It's made a good bit more complex by the fact that production of a casting is a joint undertaking of both buyer and seller; the former furnishes part of the latter's tools (patterns, and in some cases special flasks, straightening dies, gages and the like), the type and condition of which has a big bearing on costs.

At the same time, the buyer depends on the foundry he selects to pick the right alloy (that is, provide the required properties without wasting expensive alloying elements where they aren't needed), to mold and cast so rejects are few, to make castings on which subsequent operations in the buyer's own plant will

GET THE FACTS: Morley Hitchcock (left), manager of purchasing at Reliance Electric's Ashtabula plant, works out details with engineers J. K. Smith and C. J. Cobosco.

be as expected, and above all to produce sound castings that will deliver the goods in service.

This is why good liaison and close cooperation are vital to keeping costs low and quality high. And it's usually up to the purchasing agent to see that these lines of communication are kept open and functioning.

Fortunately, most modern foundries are able and willing to advise and assist customers in these matters. In fact, a healthy portion of the foundry industry's promotion and advertising budget is spent on one simple plea—consult your foundry.

Types of Foundries—This being an age of specialization, foundries, too, are inclined to specialize. The result is many different kinds of foundries and many ways in which they can be classified.

The most common foundry classification is by the type of metal they pour into castings. Some foundries can supply nearly all of the cast metals available today; but most produce castings in several related types, and a few specialize in only one kind of metal.

Foundries are sometimes classified either by the size of castings they produce or the number of castings they can handle in a typical order. The term production foundry indicates facilities for making large numbers of identical castings. Jobbing foundry, on the other hand, indicates ability to work with a variety of patterns from which relatively few castings are made per order.

Foundries are also identified with particular industries or by the type of castings in which they specialize. And still further, some are identified by special processes they use, such as shell molding, permanent molding or centrifugal casting. A few foundries are large, integrated organizations, with specialized divisions capable of meeting any casting requirement.

Purchasing Tips — While there will be many exceptions, the following rules constitute a good base of action for purchasing agents:

Understand thoroughly the quality level you're buying. Minimum standards are available from several of the foundry trade associations, and in any case can be established between buyer and seller.

Use standard specifications set up by ASTM if special properties are needed.

Spell out clearly any permissible exceptions to ASTM or other specifications; such exceptions might help reduce cost or eliminate production hazards.

Furnish patterns made for the particular metal to be cast; accuracy and dimensional tolerances can't be held with patterns made for some other metal.

Insist that locating points be shown on drawings, and that patternmaker, toolmaker, inspector and set-up man use them. Locating pads and chucking lugs will save time in the machine shop.

List all inspection requirements and provide special gages and fixtures, if necessary, to insure the needed tolerances and quality.

Arrange a sensible delivery schedule; give the foundry some freedom to cast ahead without worrying about possible cancellation. Also, resist the temptation to request immediate delivery of the whole order unless it's absolutely needed.

Finally, always keep in mind that where essential information isn't available, the foundry has to make assumptions. This may affect both cost and quality.

Make Castings Do More Jobs

The casting is made; a good bit of money has been spent on engineering, design, patterns, metal, molding and pouring.

What happens to it from here on may decide how well the investment will pay off.

■ After the casting has solidified and cooled, sand is jarred from it in vibratory shakeout machines. Then feed heads and gates are removed by sledging, shearing, torch burning or cold sawing, and fins, pads, lumps, and metal added for making the design castable, are removed in a grinding operation known as snagging. And finally, the casting is blast cleaned or tumbled to remove cores, adhering sand and scale; then it's checked, repair-welded and stress-relieved as occasion may demand.

Here again design has a marked influence on cost; a surprisingly high percentage of total cost goes into these cleaning and finishing operations.

For Cleaning Economies — A plane parting line is the most easily cleaned. Deep pockets and sharp corners, on the other hand, make cleaning more difficult.

Internal cores, long and narrow passages, and cores that are thin in relation to surrounding metal make cleaning harder; access and clean-out holes have to be provided, and even then sand may burn into thinly cored areas. The fewer the cores of any type, the easier and cheaper a casting is to clean.

Also, castings made rugged enough to be tumbled will cut down on handling and manual cleaning work.

Heat Treatment

One of the most valuable tools available to design engineers, heat treatment develops a wide range of desirable properties in iron and steel castings.

Nearly all castings are stress-relieved; that is, heated to a certain temperature and cooled slowly to relieve residual stresses.

These internal stresses in castings come from three main causes: uneven cooling or contraction within a single section because of faster cooling on the surface; a difference in cooling rates between two or more sections; and resistance of the sand mold itself to shrinkage and contraction of the casting.

Effects Are Severe — Whatever their origin, residual stresses may result in lower strength, distortion (which sometimes doesn't show up until after machining), and in some extreme cases, cracking and failure of the casting.

Usually, unalloyed cast iron is adequately stress-relieved at 950° to 1050°F, low-alloy iron between 1050° and 1100°F, and high-alloy irons are treated at 1100° to 1200°F.

For steel castings, a temperature of 750°F will reduce stresses about 50 pct; 1000°F will remove more than 90 pct. Increased stress-relieving temperatures cause a progressive loss in strength, but improve ductility and impact resistance. In normalized steels, temperatures

TABLE III **How to Anneal Gray Iron**

Process	Type of Iron	Reason	Temperature, °F	Time*	Cooling Rate
Low Temperature Anneal	Plain and low alloy irons	Breakdown of pearlite to ferrite and graphite for maximum machinability	1300 to 1400	45 minutes to 1 hour per in. of cross section	Furnace cool 100° F hour between 1000° and 550° F
Medium Anneal	Alloy irons and those not responsive to low-temperature anneal	Breakdown of pearlite to ferrite and graphite for maximum machinability	1450 to 1650	About 45 minutes per in. of cross section	Furnace cool from annealing temperature to 550° F
High Temperature Anneal	Mottled or chilled iron	Elimination of massive carbides, retaining maximum strength and hardness	1650 to 1750	1-3 hours + 1 hour per in. of section size**	Air cool to 1000° F, then furnace cool to 550° F
	Mottled or chilled iron	For maximum machinability	1650 to 1750	1-3 hours + 1 hour per in. of section size**	Furnace cool from annealing temperature to 550° F

* Shorter times may be used with modern radiant heating furnaces.

** Carbides may often be eliminated in shorter times.

lower than 1000°F have little effect on strength and ductility.

As to other heat treatments, it's well beyond the scope of this article to detail procedures and list the complete range of properties they'll produce. Hundreds of pages are devoted to this subject alone in handbooks available from the various foundry associations. In general terms, however, here are the basic treatments applied to the main types of ferrous castings:

Gray and Ductile Iron — Both types have excellent respone to heat treatment. They can be annealed or softened, flame hardened, induction hardened, quench hardened and martempered.

Annealing, generally used to improve machinability, differs from stress relieving in that it alters the basic structure of the metal. While it brings about some decrease in strength and hardness, it does increase machinability to the point where maximum cutting speeds can be used; at the same time, it also does the job of relieving internal stresses.

As shown in Table III, three different temperature ranges are commonly used in annealing gray iron. These are the low-temperature anneal, the medium anneal, and the high-temperature anneal for eliminating massive free cementite.

The various hardening treatments are used to improve wear resistance and strength. Flame and induction methods selectively harden the outside or particular portions of a casting, while the quench treatments harden it through its entire thickness.

Malleable Iron—As a rule, malleable is either surface hardened or hardened locally; while through-hardening is possible, it tends to lower ductility, which is one of the material's chief attributes.

Because its combined carbon content allows rapid hardening, pearlitic malleable is usually chosen over standard grades for surface hardening. Pearlitic malleable is first heated at 1500° to 2100°F, then liquid quenched either in oil or water. Oil makes for shallow hardening, and so gives less distortion and cracking in complicated castings. For toughness, the casting can be tempered at about 600°F and still produce a hardness of 52 to 57 Rc.

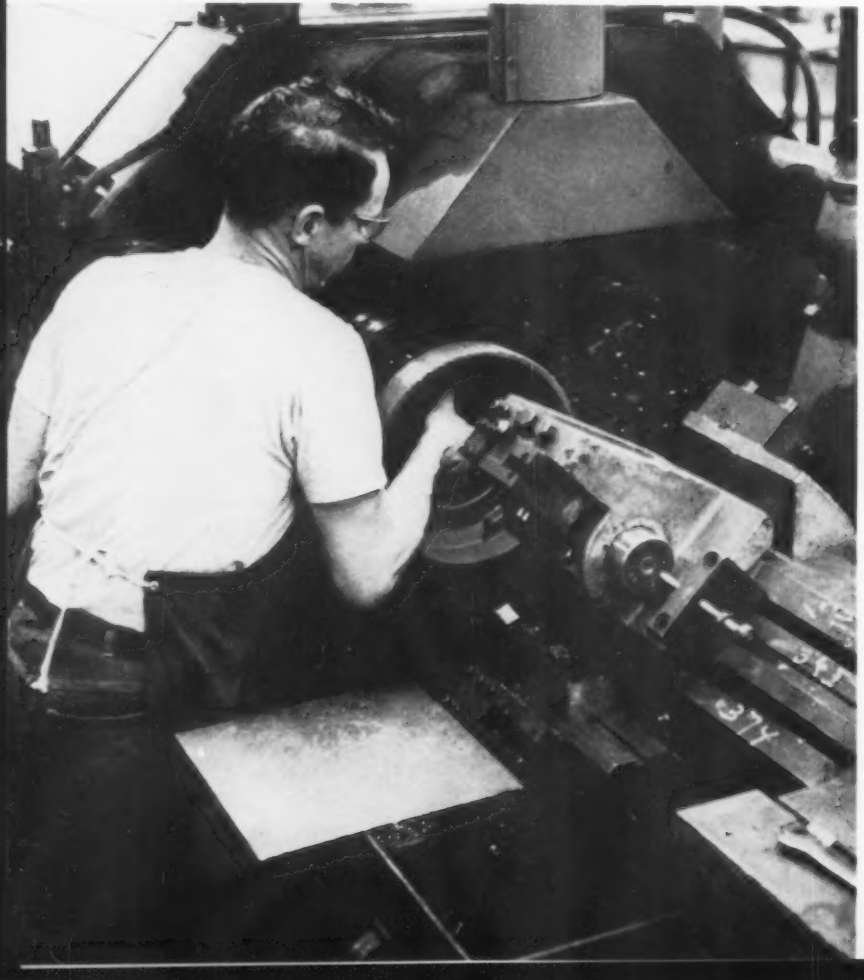
Standard grades are surface-hardened in about the same way, except that they're heated for a longer time and cooled quickly through the critical range to keep carbon in the combined form; hardness will be about 50 Rc.

Cast Steel — Steel castings are given a full anneal, a normalize, a normalize and temper treatment, or a quench and temper treatment, depending on the type of steel and on the properties desired. Castings are also differentially hardened, either by partial quenching or by flame hardening, and they can be carburized, nitrided or cyanided.

Annealing is used mostly on high carbon steels, large castings, and low-carbon electric steels. Alloy steels are usually given only a normalizing treatment. While full annealing increases ductility, it also lowers tensile, yield and impact strength. Steel castings are annealed by heating slowly to above the transformation temperature, soaking at temperature to recrystallize and correct element segregation, cooling slowly in the furnace to 1000°F or less, then cooling more rapidly.

Normalizing is done in about the same way, except that the casting is cooled in still air directly from treating temperature. It produces higher strengths than annealing in both carbon and alloy steels.

Hardening Treatments — Liquid quenching is often used after a casting has been annealed or nor-



FOR CLOSE FIT: Four-spindle chucking machine turns and faces electric motor end-bracket castings.

malized. The casting is heated to about 100°F above the metal's transformation temperature, held there until carbides are in solution, then quenched either in oil or water. Water is the most popular quenchant. Generally, a liquid quench is used to increase toughness rather than hardness.

After normalizing or quenching, steel castings are usually tempered at temperatures between 900° and 1250°F. Tempering removes stresses set up by hardening and increases ductility and impact resistance, but lowers tensile and yield strength.

Welding and Joining

Gray Iron—Contrary to popular belief, gray iron can be welded successfully by several processes, as well as brazed and soldered.

Normally, there's little need for welding cast iron—the practice is used mainly to repair minor casting defects or fix parts which become damaged in service.

But once the few special techniques have been mastered, welding can also become an important cost-cutting tool—first, in making it possible to join cast iron to other metals; second, to make low-cost cast iron suitable for uses which might otherwise require more expensive materials; and third, as a means of combining several simpler iron castings to form an intricate part which would be more costly to cast as a unit.

Basic Needs—Sound welds require four things: preheat, gray iron electrodes or welding rods, flux, and postheat.

Preheating is essential for uniform expansion to prevent induced strain and possible fracture. Gray iron weld metal insures formation of graphite flakes (and thus, the same structure) by replacing the silicon that's burned out at high fusion-welding temperatures. Flux increases fluidity of the iron-silicate slag that forms on the molten puddle. And postheating followed by slow cooling relieves any residual stresses left by welding.

PROMPT INSPECTION: Foreman of testing department at Reliance checks dimensions of inbound castings against engineering drawing specs.

Beyond this, gas welding is the better method. While slower than arc welding, it has the important advantage of providing better heat input control. Oxy-acetylene welding is generally more foolproof from the standpoint of strength, machinability and overall uniformity.

Weld is Strong — A properly made weld will be as strong as the parent metal. It's less expensive than braze welding, and the casting can be enameled. In some cases welding can also be used on castings which have been oil-soaked or exposed to heat.

Brazing is the next most important method of joining or repairing cast iron. Two main classes of brazing alloys are used: Copper and copper-base alloys; and silver-base alloys, commonly called silver solder. The latter produce bonds as strong as or stronger than the parent metal.

Arc welding is also used, mainly where preheat isn't necessary, and in overhead positions where brief fluidity is desirable. But because it often produces hard zones, it supplements rather than replaces oxy-acetylene welding.

Other processes include braze welding, arc with mild steel or gray-iron electrode, carbon arc welding, inert-gas tungsten-arc welding, arc braze welding, soldering, thermit welding, flash and pressure welding. Each, however, has somewhat narrow limitations.

Malleable Iron — For the most part, fusion welds in malleable iron are brittle and therefore undesirable for uses involving stress. Welding can, however, be used where tensile stresses are low or compressive.

In any case, weld-repair of minor casting defects is permissible if the heat doesn't penetrate stressed portions or if the casting is re-annealed after welding. Brazing and soldering can be used at temperatures under 1350°F; silver brazing alloys are common choices.

Usually, though, malleable castings are joined with bolts, screws and rivets. In some cases malleable's ductility is put to good use by providing lugs, edges, bosses or flanges that can be crimped, peened or spun to join malleable iron castings to each other or dissimilar parts.

Carbon and Low-Alloy Steel—Steel castings can be welded as easily as their wrought counterpart, and with the same materials and

TABLE IV

Machinability Ratings

Metal	Machinability Value, pct*	Hardness, Bhn
Malleable Iron:		
Standard	120	110–145
Pearlitic	90	180–200
Cast Iron:		
Soft	80	160–193
Medium	65	193–220
Hard	50	220–240
Steel:		
1020	90–75	122–134
1040	75–45	185–225
1120	80	143–179
1330	65–40	160–187
4130	65	187–229
4340	35–20	200–400
8430	60–50	180–200
8630	65–40	175–240

* AISI B1112 free-machining screw stock = 100

procedures. In fact, the average amount of underbead cracking is much less in welded cast steel than in comparable rolled steel.

Cast steels with 0.25 pct C and less than 0.50 pct Mn are easily welded without loss of ductility next to the weld. Slightly higher carbon and manganese make for borderline weldability as-welded but present no problems if they're stress-relieved. Above 1.0 pct C, the casting isn't considered weldable without preheating.

Welding engineers for the most part agree that, to prevent cracking in carbon and low alloy steels, Vickers Brinell hardness of the weld bead shouldn't be more than 350.

Two Main Uses—Repair welding is a commonly used finishing operation, especially on large, complicated castings that would be hard to cast without some flaws.

The other big area of cast steel welding is where steel castings are used in composite welded structures. It's just as easy to weld steel castings to each other and to steel forgings, plate and rolled shapes as it is to weld plates of similar composition.

Machining

Because the various machining operations add up to a major item in production costs, it's a phase that deserves especially careful study. The aim is to find a combination of material, machine, tooling, and procedures that will keep overall finishing costs low.

All of the principal cast ferrous metals are easy to machine. Their relative machinability, using AISI B1112 free-machining screw stock as a base of 100, is shown in Table IV.

Standard malleable iron is considered the most easily machined and free-cutting.

Running a close second are pearlitic malleable, gray iron and the carbon steels. Cast steel's machinability is about the same as for wrought steels of similar type.

Grinding and Honing — Both have long been used as economical finishing operations after machining. Today grinding has widely replaced machining operations on castings.

While direct finishing of castings by grinding has a number of limitations, it also offers significant advantages.

For one thing, stock allowances can be as little as will clean up; machining allowance has to be a good deal greater.

It works well on interrupted surfaces such as those having slots or ports.

Moreover, grinding can be used to finish heat treated castings and types of iron which are too hard to machine. And finally, it often produces better finishes.

To analyze all the possible variables and make certain of having the right methods for a particular job, it's wise to consult abrasive and equipment manufacturers.

Coatings and Finishes

Ferrous castings can be finished with an almost infinite variety of materials and methods.

Metallic and non-metallic surface finishes range from decorative coatings like paint to finishes that impart special properties to meet unusual service conditions. They're applied by spraying, brushing, welding, cementation, dipping, chemical conversion, chemical reduction, or electroplating.

Since the field is so broad, only the main classes of coatings can be listed here. A wealth of data and sound advice are, however, available from specialists in each field.

Paints, enamels, lacquers and organic finishes of many types are widely used. These include plastics, rubbers, and asphalt or pitchbase materials.

Vitreous or porcelain enamels are another popular choice.

Heavy linings and jackets of cement are used for corrosion protection, mainly on pipe.

Plastic and elastomeric sheet materials are bonded both to inside and outside surfaces for resistance to chemicals and corrosive attack.

Plating, tinning and galvanizing are common methods. Aluminizing, chromizing, and sprayed-metal coatings of all types are showing up in more applications.

And chemical conversion treatments to form oxide and phosphate surface films are used.

Acknowledgements: The editors thank the many persons and firms whose help made this feature possible; and in particular, the Alloy Casting Institute, Mineola, N. Y.; the American Foundrymen's Society, Des Plaines, Ill; the Gray Iron Founders' Society, Cleveland; the Malleable Founders' Society, Cleveland; Meehanite Metal Corp., New Rochelle, N. Y.; and the Steel Founders' Society of America, Cleveland.

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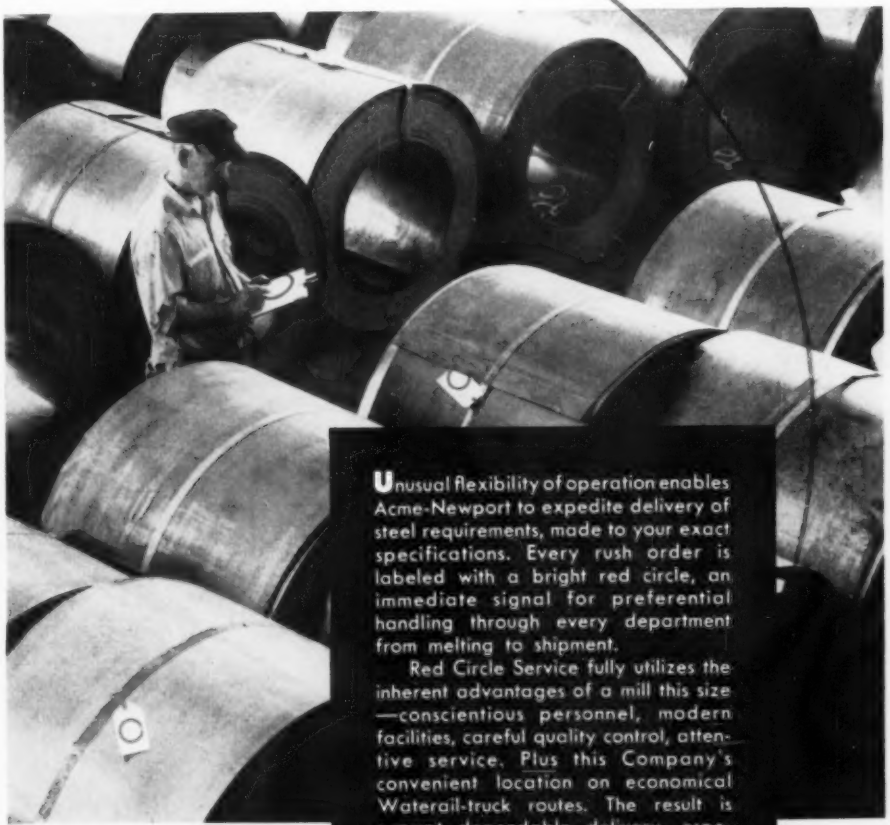

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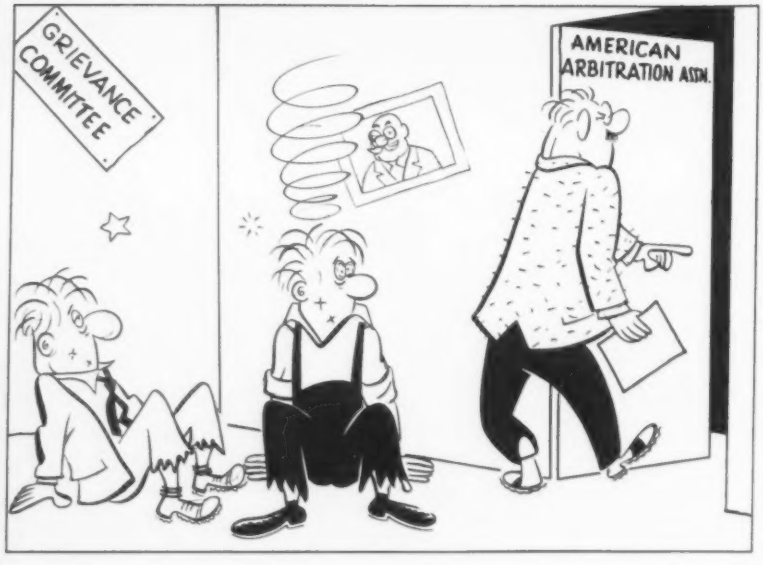


You Arbitrate It!

THE URGE FOR OVERTIME

From The Files Of
The American Arbitration Association

Adolf G., a grinding machine operator in a cutlery manufacturing shop, was on an incentive plan and generally able to earn about 30 pct more than the base rate for his job. Even when he'd be temporarily transferred to time work for the convenience of the company, he would still get more than base rates; his pay would be computed on the basis of average incentive earnings.

This procedure was in accordance with the contract. It read: "When work is available on the employee's regular job the company shall have the right to temporarily transfer employees to other jobs provided the employee transferred shall be paid the highest of the following: (1) Base rate of job transferred from; (2) The employee's average hourly earnings; (3) The average hourly earnings of the job transferred to; (4) Base rate of the job transferred to."

Seemed Clear, But—This seemed clear enough until, one Friday, the foreman asked a number of men to come in on overtime the next day and do some non-incentive work. Under the contract, overtime was offered by seniority and the men were free to decline. When Adolf was asked, he was glad to accept; time and a half based on his average incentive earnings was too good to turn down.

However, next pay day, Adolf saw he was not paid average earnings, but the base time rate for the job he did. "What's the idea?" he demanded. "I always got average earnings before. Why not now?"

"This time it's different," explained the personnel manager. "When we take you off your job and assign you to other work, you have to accept the temporary transfer whether you like it or not. That's why you keep your high rate. But overtime is voluntary. You are free to refuse. And that's why you got only the rate for the job you actually performed."

The case wasn't settled in grievance procedure; eventually it went to arbitration under the rules of the American Arbitration Assn. How would you rule?

(Ruling On Opposite Page)

NEW FILMS

"Steel Valley" tells how light, tough, new super alloy steels and reactive metals are made. Rapid strides in special steel development, including stainless, is a main feature. It also includes shots of melting and processing. Television's part in rolling, rolling titanium, and continuous formation of thin stainless steel strip in 300-ft rolling mills are other highlights. 18 min. Public Relations Dept., Sharon Steel Corp., Sharon, Pa.

"The Big Attraction" tells the story of electrostatic spray painting in industry. It's primarily aimed at those interested in factory production line painting operations. 30 min. 16-mm color, sound. Ransburg Electro-Coating Corp., Barth & Sanders Sts., Indianapolis 7, Ind.

"Pathway to Profits," stars an in-floor conveying system. 12 min. 16-mm color, sound. Public Relations Dept., Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

"Modern Material Handling" stresses importance of battery power. Edison Storage Battery Div., West Orange, N. J.

The Arbitrator Ruled:

He said the key to the situation was in the first sentence of the quoted clause: "When work is available on the employee's regular job, the company shall have the right . . ." This meant that a worker who was taken from his regular machine was not to lose pay. But on the Saturday in question, work was not available. Consequently, said the arbitrator, the company was not required to pay the aggrieved employee average hourly earnings for non-incentive work on Saturday.

Caution: The award in this case is not necessarily an indication of how arbitrators might rule in apparently similar disputes. Each case is decided on the basis of the particular history, contract, testimony and other facts involved. Some of these essential details may have been omitted in condensing the original arbitration for brief presentation.

TECHNICAL BRIEFS

Centralized Controls Aid Heat Treating

Centralizing all your shop controls in one area can save your control men valuable time and up efficiency.

Centralizing them away from the din and vibration of production equipment assures accurate operations, too.

▪ Precise heat treating of 900 million parts a year demands high standards of operating efficiency. And a firm handling this volume of work found that controls scattered all over the place just wouldn't deliver this. So the company moved all temperature controls off the heat-treat floor into a centralized room overlooking it.

The move is part of a continuing modernization program at National Cash Register Co., Dayton, O. It not only involved the relocation of older controls but the addition of new ones. Among the newer instruments were 38 strip-chart Speedomax H on-off and duration—adjusting type controllers which supplement older Leeds & Northrup instruments still in use.

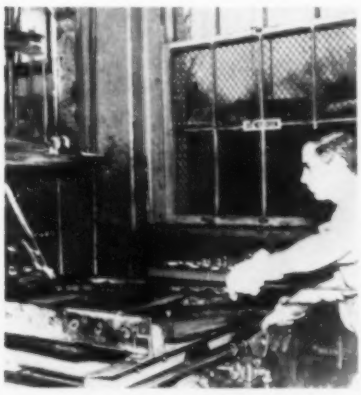
One Man Sees All—From the centralized room, one man oversees the entire heat-treat operation. He receives records of incoming jobs, schedules the heat treats, sets the control temperatures, and posts on the instrument chart itself the job number as well as the time in and out of the furnace. This procedure, combined with modern materials handling techniques and reliable

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 123. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

instrumentation, enables the company to meet their high production schedules.

To process the many thousands of parts used in their cash registers and accounting machines, the firm does its own heat treating. Operations include carburizing, hardening, tempering, annealing, and copper brazing. Furnaces are both batch and continuous (electric) and include gas carburizers, cyanide pots,



Operator inserts work into a carburizing furnace.

salt pots, lead pots, bell annealers, draw furnaces, induction heaters and sintering furnaces.

Parts are made of steel—from low carbon strip to alloys. In order to meet wear and service standards, each part must meet precise heat-treating specifications. With few exceptions, temperature controls must hold furnace temperatures within ± 10°F. This requires high accuracy and reliability in the instruments to provide reproducible results day after day.

Burnishes Any Metal

For use on all metals or alloys, a coloring and burnishing compound imparts a high gloss and virgin-metal color in a run of 45 minutes to one hour. It leaves no film of any kind and yields clean work, says its suppliers, Lord Chemical Corp., York, Pa.

Grinds Tiny Particle

Successful fine grinding of particles to a half-micron in size is re-

TECHNICAL BRIEFS

ported by Sturtevant Mill Co., Boston. Performed in fluid energy mills with no moving parts, the fine grinding method works with anthracite coal, titanium dioxide, sulfur, etc. The variety of materials that can be reduced to submicroscopic sizes is growing every day, says the company. New materials constantly are being tested and work is in progress to adapt to new unit to handle extremely hard and abrasive materials.

One Barrel Finisher Performs Many Jobs

Many metalworking shops have use for barrel finishing and deburring equipment in various sizes and for different work applications. But they face this reality: in many cases it costs more than it's worth to install equipment for each individual job.

Such shops can now feel at ease. Speed-D-Burr Corp., Glendale, Calif., says it has one machine that does the work of many.

Works Three Ways—The company's new multi-use barrel comes in sizes ranging up to 120-in. ID. It can be used in any of three ways.

For large loads the new barrel may be used as: (1) A single cavity barrel; (2) By simply inserting an optional "compartment" type container into the main barrel it provides six or more separate divisions. Each of these is capable of holding a different job and using another type of media; (3) By placing in

Dual doors aid inspection of job done inside this barrel.

the single cavity a custom-designed holding fixture to which large work pieces may be attached, it provides an economical means of finishing parts up to 118-in. long.

Any of these changes can be made with little effort in a matter of minutes.

Oily Stampings Don't Stick to Belting

A problem that has puzzled companies manufacturing conveyors on which oily metal stampings and other objects are transported from one job to another has been solved by M-H Standard Corp., Jersey City, N. J. It's done by using pebble grained carbon strip for the conveyor belt.

Normally the belt surface of the firm's conveyors is flat and smooth. But wherever stampings are made,

Pebble graining of this belting prevents items from sticking.

they usually are coated with oil to save the dies. This oily film has a tendency to stick on a smooth belt.

Fabricating the conveyor built for use in the metals' field, the company found it expedient to use a rough surface. Sharon Steel Corp., Sharon, Pa., helped solve the problem with the pebble-grained strip steel which prevents suction between the belt and the object being conveyed.

This strip is produced by passing strip stainless, carbon or coated steel between two rolls; one contains a pattern which is imprinted on the strip surface. Originated for auto-

motive and industrial designers, this is its first known use for heavy equipment.

Drill Press Table Speeds Analysis

Use of a shop-made revolving table instead of the conventional table on a drill press speeds analysis of copper and copper-base alloy heats in one company's casting operations.

Employed by Wolverine Tube Div., Calumet & Hecla, Inc., Decatur, Ala., the setup emphasizes speed. Speed is important because casters must wait for test results before pouring a heat. A sample is taken and sent to the lab through a pneumatic tube line. The lab technician immediately drills the sample to obtain shavings for analysis of the content of the heat.

After performing the tests, he telephones the results to the casters on the casting platform. The entire operation takes only three to five minutes.

How It Works — The revolving table is used on a drill press made by Delta Power Tool Div., Rockwell Mfg. Co. It holds a vise in which the sample is clamped. Revolving around a rod supported by the column, it may also be clamped in position.

With the table in the horizontal position, the lab technician clamps the sample in the vise and drills the sample. After drilling, the sample and drill shavings are dumped into a pan by rotating the table 180°.

Using this setup shaves a minute off heat-analysis time.

This rapidly clears the table and vise. The table also turns on the column so that the piece may be quickly positioned under the spindle for each drilling.

This setup cuts at least a minute off waiting time, an important saving in the critical waiting time involving an average of 134 heats per day.

Constant Power Weld Units Have Advantages

In choosing equipment for automatic and semi-automatic welding, it's important to consider factors that can spell the difference between the best and second-best possible job. No one piece of welding equipment affords maximum efficiency at minimum effort and cost on all work.

There's always some job that demands special attention or a particular type of machine. The ultimate user profits when he knows and understands the assets of different types of welding setups.

Three Basic Types — There are three basic types of volt-ampere characteristics currently in use in automatic welding equipment. These are: (1) the rising characteristics; (2) the flat; (3) the drooping characteristic. Considering the three basic volt-ampere curves available, Glyn Williams, welding engineer at Hobart Brothers Co., Troy, O., finds that the flat characteristic of-

fers many advantages to automatic welders. In fact, he believes this characteristic, with possibly enough voltage rise in the machine to compensate for the voltage drop in the circuit outside of the arc itself, "is by far the best."

Some applications have been been found where a slightly drooping characteristic is necessary or desirable, however. This can be done with a constant voltage type machine.

Why Constant Voltage? — There are several reasons why this welding engineer likes the flat voltage characteristic (or true CV power). Constant voltage for automatic and semi-automatic operations offer the following advantages, he states:

First, it allows independent control of the welding variables. Equipment on the market today furnishes adequate control of the rate of travel, rate of wire feed, and—with a power supply having constant voltage—the arc voltage. Welding current is tied very closely to the wire feed. On the other hand, with either the rising or the drooping characteristic, the arc voltage becomes a function of the wire feed or welding current. Result: independence of control associated with a CV machine is lost.

Using CV power, units like this operate four arcs at once.

Control Is Important—When setting up a job, quite often a point is reached where bead contour is controlled by arc voltage, whereas, the

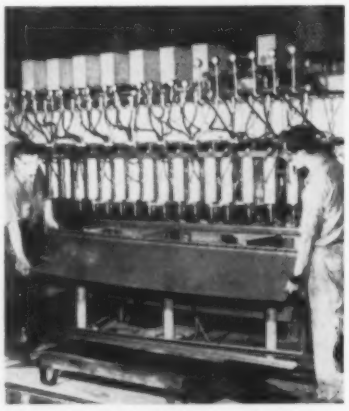
amount of metal deposited is controlled by the wire-fed speed. By being able to control these two items separately, welding conditions can be established quickly, with little confusion. Likewise, once the procedure is set up using constant voltage, it's relatively easy to duplicate work in the shop.

With CV power supply, it's possible to run more than one arc simultaneously. Some applications using up to four arcs are being operated daily from a single unit. Applications with two arcs working fully or semi-automatic are numerous. Where voltage remains constant, multiple arcs can be set up and run independently of each other, using a single CV power unit.

Spotwelder's 20 Guns Rapidly Join Parts

Designed and built for its own use by a steel shelving producer, a 20-gun resistance spot welder lets two men turn out 180 side-panel assemblies an hour. This compares with 16 an hour previously produced with rocker-arm, individual spot welders.

Constructed and employed by Standard Pressed Steel Co., Jenkintown, Pa., the spot welder features



On this setup, the machine uses only 16 of its guns.

versatile controls. These allow its operator to select any combination of guns from 1 to 20 in a matter of

seconds. It'll make simultaneous spot welds at intervals as close as 6 in. The welder handles lengths up to 123 in., thicknesses to 0.172 in.

The company is currently developing alternate dies to permit adaption of the welder for use on other components.

Manufacturer Produces Bellows of Inconel

To meet tough requirements of many new high-pressure and high-temperature jobs, a manufacturer has developed metal bellows of Inconel and Inconel-X. The nickel-chromium alloy bellows are now in use in various aircraft and nuclear engineering applications.

Aside from its high strength and resistance to corrosion at high temperatures, the Inconel-X bellows have excellent stability and "hysteresis," says Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn. These bellows, of age-hardening material, are particularly designed for aircraft controls and similar uses where precise response must be repeated many times over for an extended period.

Bellows Are Durable — Recent tests by the firm indicate the bellows are very durable. The company reports they outlasted bellows of another material three times over. A 4-ply Inconel bellows of 2-in. OD can withstand 1000 psi pressure at room temperature. Inconel and Inconel-X can be used in high temperatures up to 1500°F.

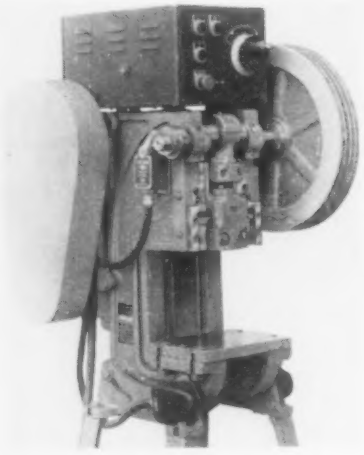
Inconel bellows are being manufactured in a wide variety of sizes from 15/32 to 12-in. OD and in single to four plies.

Cuts Die Weights

A new high-strength zinc base alloy is for use in metal forming dies. Developed by National Lead Co., New York, and Morris P. Kirk & Son, Inc., Los Angeles, the alloy can be used in dies and tools for producing sheet metal stampings.

New Production Ideas

Equipment, Methods and Services



Safety Features Abound on New Punch Press

Safe operation is stressed by the maker of this 8-ton punch press. Designed to give complete safety in its die area, the press boasts many "fool proof" features. Using the machine for single-trip operation, the operator must depress two widely separated hand controls and hold these until the ram reaches the bottom of its stroke. The operator cannot fasten one control in the "down" position. Both must be depressed and released to complete a stroke. Hence, the operator's hands cannot possibly be in the danger area during the punching period. Flywheel-in-motion and clutching mechanism hazards are eliminated by the use of a special high-starting torque motor which delivers power directly to the crankshaft. In single-trip work, the motor goes dead after every cycle. When power is disconnected, or if it fails, a heavyduty brake applies automatically. (Kenco Mfg. Co.)

For more data circle No. 43 on postcard, p. 123

Press Brake Fabricates Light Gage Sheet

This 6-ft hydraulically operated press brake features an adjustable stroke. It's designed for light gage sheet forming and fabricating operations. Maximum capacity of the press brake is 20-gage mild steel over a 6-ft bed. Its stroke adjustment features enable the operator to have complete control over the ram during forming and punching operations. Although length of stroke can be varied, the ram speed always remains constant. For example, a rate of 80 strokes per minute is obtained on a ¼-in. opening while at the full opening of 1½-in. the rate is 32 strokes per minute. The press brake's ram is mechanically linked to a cam shaft which is turned by power applied to a rotary hydraulic cylinder. Oscillating action of the cylinder has a maximum movement of 270°. (O'Neil-Irwin Mfg. Co.)

For more data circle No. 44 on postcard, p. 123

Vacuum Handler Lifts Up to 20-lb Loads

Capable of lifting up to 20-lb loads, this materials handler uses vacuum for its lifting power. The compact hand unit is designed primarily for lifting small, light objects (i.e., metal stampings, cans, sheet stock). A special neoprene seal contacts the surface of the object to be lifted, allowing a vacuum to be pulled via a vacuum pump and motor unit. It handles hot objects up to 200°F. Strong vacuum force attaches the lifter and object to be lifted as though they were one piece. To release the object, a convenient finger valve permits the vacuum to bleed off, thus breaking the seal without scarring or marring the object's surface in any way. For handling very hot objects (to 600°F) a special silicone seal is used in place of the Neoprene one. (International Staple & Machine Co.)

For more data circle No. 45 on postcard, p. 123

FABRICATION WON'T FLAKE TI-CO EITHER

A jai-alai ball travels at speeds over 100 m.p.h.—hits with terrific impact. From a distance of only 60 feet, one of Mexico's leading jai-alai players, Jose Fuerto, slammed the ball into a TI-CO Galvanized Sheet again and again—severely pounding it—but there wasn't a sign of flaking!

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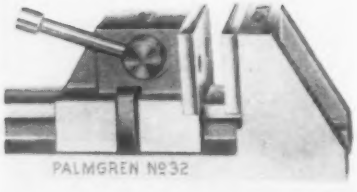
Sealing Fastener Conforms to Curved Surfaces

A new sealing type fastener provides a secure triple seal on irregular, corrugated or curved surfaces as well as flat surfaces. The fastener consists of a patented, spring type, hardened washer with a permanent flowed-in gasket sealant. This is preassembled to any type of standard machine screw, cap screw or bolt. The product overcomes a common problem of sealing fasteners, says its maker; this is the subjecting of the seal to twisting and tearing actions. Reason for this is because the washer doesn't turn when the screw or bolt is tightened. These new fasteners are suitable for weather sealing of metal siding, roofing, truck body work, etc. Other applications might include various sealing jobs on kitchen and laundry appliances, air conditioners, boats, etc. The sealing washer also acts as a lock washer. (Russell, Burdsall & Ward Bolt & Nut Co.)

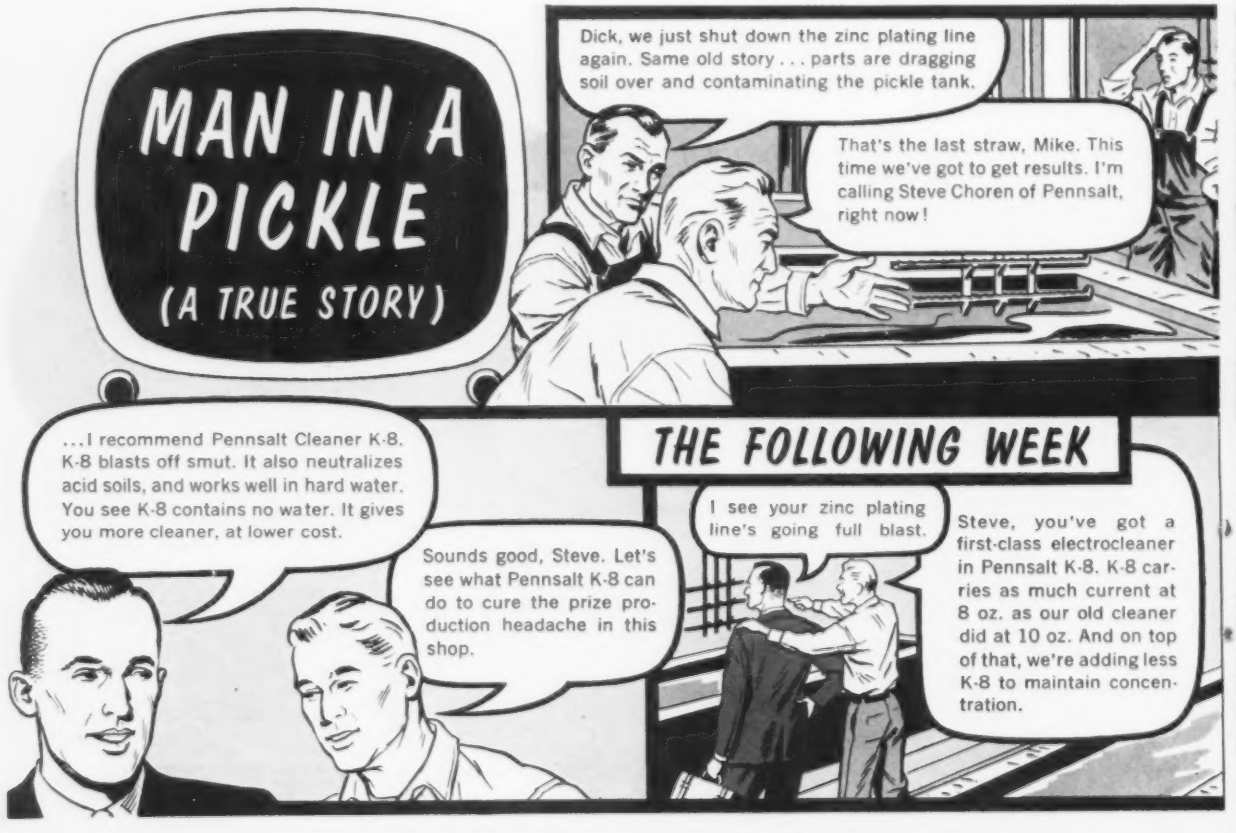
For more data circle No. 46 on postcard, p. 123



Holding Vise Jaws Lock Quickly

A new quick-locking vise has no screw to be damaged by wear or breakage. Bearing and locking surfaces are hardened to give long service. For all operations requiring fast adjustment for various size pieces, only a flick of the locking lever is necessary to release the quick lock. The movable jaw slides easily to any position. It weighs just 2½ lb. (Chicago Tool & Engineering Co.)

For more data circle No. 47 on postcard, p. 123



Machine Cuts and Straightens Wire Stock

Wire ranging in diameter from 1/16 to 5/16 in. can be straightened by this variable speed automatic machine. Of the straightening arbor high-speed type, it employs five elongated split-dies mounted on ball bearings for reduced vibration. The machine provides a choice of feed ranges from 50 to 200 fpm. Using a Warner electric brake on its clutch shaft, the unit's feed roll housing is totally enclosed with shafts mounted on Timken bearings. An angled, electric control panel provides for one-position operation. Micro-Switch trips a new improved target which has a positive setting and positive release. And a National Acme solenoid operates the Hilliard roll-type clutch. Its drive shaft is mounted on ball bearings; fly wheel on roller bearings. (Mettler Machine Tool, Inc.)

For more data circle No. 48 on postcard, p. 123

Detachable Boom Converts Handler to Lifter

A materials handling equipment maker now has available a detachable boom for its line of 3000 to 4000-lb draw-bar pull and 4000 to 5000-lb draw-bar pull gasoline or LP-gas tractors. The boom operates in conjunction with a winch. It's fabricated of channel and bar stock, and can be mounted or removed in minutes. For users who have occasional need for lifting or transporting heavy products over short distances, the winch has power take-off connected directly to the transmission. Capacity is 7000 lb. The attachment's winch

can be used with or without the boom, thereby extending its versatility. (Mercury Mfg. Co.)

For more data circle No. 49 on postcard, p. 123

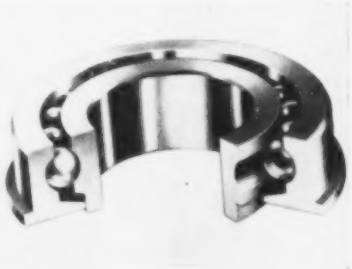
Tube Handler

With a new automatic machine, one supervisory operator now does the work previously done by five men. Recently installed in an eastern tube mill, it uses two endless chains with prongs. These take up the tubes, one by one, from a fall-out table. Then, it positions them between two spindles which ream their ends to restore roundness and remove burrs. And it counts them into bundles which are automatically tied with twine. As soon as a number of bundles has been assembled side by side, they are picked up by an integral crane and deposited upon a pallet. The machine handles up to 60 tubes per minute. It adjusts tubes carrying from 18 in. to 7 ft in length and from ½ to 1-½ in. OD. (Automation Design & Machinery Co. Inc.)

For more data circle No. 50 on postcard, p. 123

New Bearing

New bearings now available feature solid inner and outer raceways and a full complement of balls. They have no loading slots or split races to admit balls to the bearing.

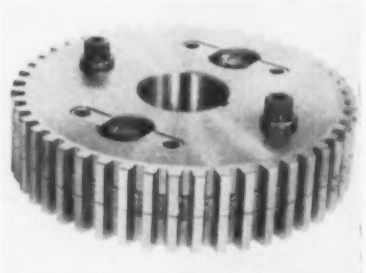


This unique design results in low cost bearings with close tolerances, close radial and axial clearances and high finish, its maker says. Deep, unbroken ball grooves provide durability and increased capacity for radial and thrust loads. (Nice Ball Bearing Co.)

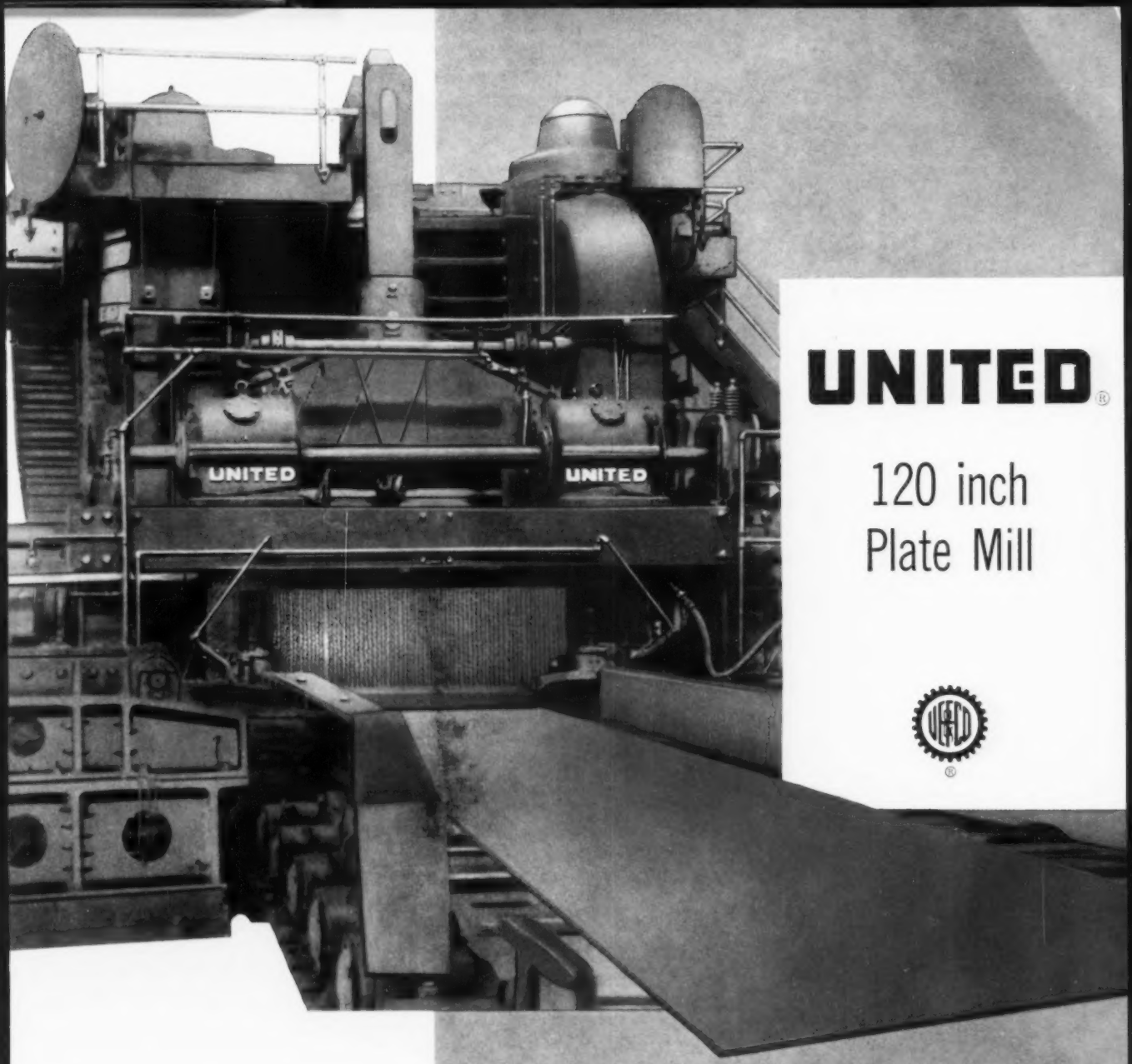
For more data circle No. 51 on postcard, p. 123

Chamfering Tool

A process for producing profile-blended or straight precision chamfers on the tips of gear teeth has been developed. Initially designed



for marine-type gears, the process also applies to any type of spur or helical gear teeth. It'll either provide nick-proof chamfered surfaces at the tips of teeth or remove burrs at the tips left by gear tooth pro-



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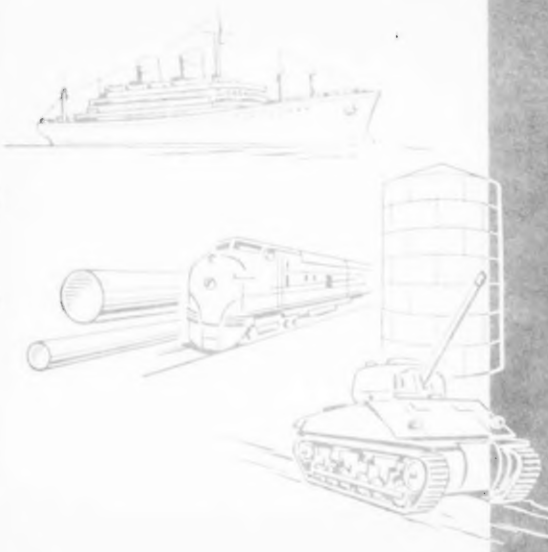

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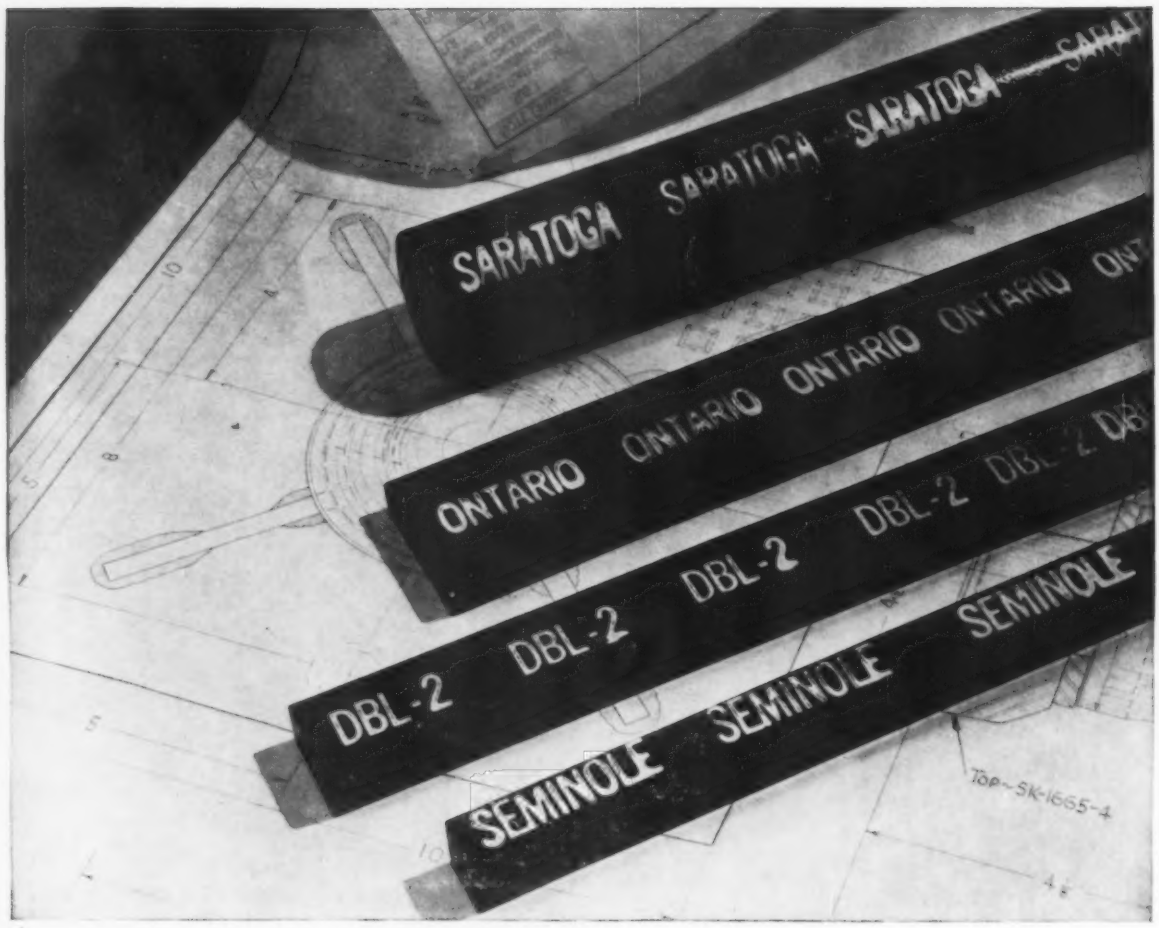

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duction processes. The process makes use of a specially-designed rotary chamfering tool. This mounts on the cutter spindle of a conventional rotary gear shaving machine in mesh with the gear to be chamfered. The chamfering operation is performed by reciprocating and rotating the tool while feeding it to tight-mesh depth. (National Broach & Machine Co.)

For more data circle No. 52 on postcard, p. 123

Boring Machine

Rapid hole making is the job of a new high-speed boring machine. It solid-bores, trepans or counterbores long holes up to eight times faster than some other units. With a capacity for holes from 5/16 to 4¼-in. diam, it handles a large range of work sizes. In general, it is suited for work that is, or can be made, symmetrical for balance in rotation—round, square, octagonal, tapered or stepped. In addition to parts with long holes, the borer works identical parts which can be bored as one piece, then cut apart. (R. K. LeBlond Machine Tool Co.)

For more data circle No. 53 on postcard, p. 123

Variable-speed Belt

Made of oil and heat-resistant neoprene, a new belt doesn't require dismantling of machinery for installation. It's precision balanced to eliminate vibration, and can easily be adjusted for any desired length. It helps cut down the need for special belts for use on specific machines. (Manheim Mfg. & Belting Co.)

For more data circle No. 54 on postcard, p. 123

Electrolytic Grinder

Built for use in shops with medium volume and medium-duty work is a new electrolytic chip-breaker and cup wheel grinder. It's recommended by its maker for grinding operations in which a dual

purpose machine can be used to advantage. Its electrolytic power supply unit is set in the base of the Hammond machine. Controls are set at eye level; they can be swiveled to face the side of the machine which is being operated. Output capacity of the electrolytic supply is 150 amps. (Anocut Engineering Co.)

For more data circle No. 55 on postcard, p. 123

Saw, Cutter Holder

Designed to save tooling costs and set-up time, this circular saw and cutter holder adapts to any powered spindle machine such as a miller, lathe, drill press, etc. Precision made, hardened, in black oxide finish, the holder can be set

up to hold any one of 400 different types and sizes of circular saws or cutters—in a matter of minutes. It adapts to a 4-in. diam and any thickness up to 3/16 in. The holder accommodates five different standard hole sizes of ½, ⅝, ¾, ⅞ and 1 in. (Tom-Tec Products).

For more data circle No. 56 on postcard, p. 123

Carbide Face Mills

Large size face mills now available have 3 and 3½-in. diameters with 1¼-in. integral shanks, and 4-in. diameters with a 2-in. shank. The stubby design of these carbide face mills brings the cutter close to the spindle bearings. This reduces overhang and strengthens tool support and rigidity so that high mill-

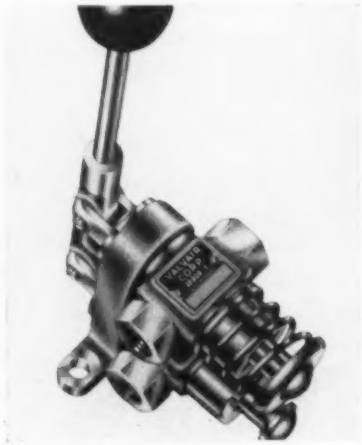
ing machine capacities can be used when working aluminum, brass, magnesium and steel. The stubby,

one-piece design absorbs shock and strains for long tool life. (Niagara Cutter Div., Bollier-Damerell, Inc.)

For more data circle No. 57 on postcard, p. 123

Control Valves

Available in both 3 and 4-way types, new lever-actuated tandem mounted control valves also feature a neutral position. Especially de-



signed for the simple solution of difficult or unusual valving problems, they give up to 250-psi pneumatic, 325-psi oil or vacuum service. (Valvair Corp.)

For more data circle No. 58 on postcard, p. 123

Diecasting Unit

A new hydraulic zinc heavy duty diecasting machine claims many features. It has a capacity of 7 lb shot in zinc, 150-ton locking pressure. The machine uses 2½-in. tie bars, 24 x 24-in. steel platens. With an extra large capacity melting furnace, the unit employs manifold mounted valves. It has high cycling speed and converts to aluminum via a cold chamber attachment. (ABC Die Casting Machine Co.)

For more data circle No. 59 on postcard, p. 123

Wheel Bushings

All of one manufacturer's grinding wheel bushings and sleeves are now made from a laminated paper base tube. This tube is said to have excellent dimensional stability at elevated temperatures. The material is a paper base phenolic resin laminate. It was specially developed for use in grinding wheels cured at high temperatures, including those cured at temperatures higher than 300°F without preheating. (Taylor Fibre Co.)

For more data circle No. 60 on postcard, p. 123

The Iron Age Summary

Bottom Stabilization Sets In

The most severe recession in years is apparently approaching the bottom of the cycle.

Industry's price structure remains strong in spite of weak market. Increases will have to come with higher labor costs.

■ This month the steel industry will bottom out of the most severe recession in several years. But the end of the decline in orders and production by no means suggests an immediate splurge in new orders.

There could be a very mild pickup in April and May with some early straws in the wind in March.

Some Confidence—A close check of the steel market shows that the steel industry's confidence is a little more potent than it was a month ago. Some of this change in attitude may be because the industry is becoming accustomed to the low order volume, but it is also based on some substantial indicators.

For one thing, the steel price structure is strong. It shows no sign of bending. Recent declines in a few stainless steel prices are not considered as a weakness in the price structure of that type of steel. These changes have had no effect on the general broad steel price structure.

Higher Costs Ahead—Were it not for the strong basic condition of steel prices, the industry probably would be back in the so-called pauper stage, a position all steel companies hope they never get into again.

Higher wage costs, high material costs, expansion costs, and the need for liquidity to carry out future necessary repairs, maintenance, and expansion are realistic reasons why there has been no demoralization in the price structure so far.

Price Increases Coming—In fact, there is every indication that higher wage costs on July 1, imbedded in the current labor contract, coupled with those which went into effect Jan. 1, will force a price increase in July ranging from $5 to $7 per ton.

Incoming orders this week are not any worse than a week ago and bottom stabilization seems to have set in. This experience is fairly universal throughout the industry.

Seasonal Factors—The pessimism that was rampant in the industry probably was overdone when used as a criterion for future activity. Even in so-called recessive periods, seasonal effects do take hold.

Smaller users are at the danger point in terms of inventory. Their consumption has been significantly greater than their ordering and many have cut back too far.

Strong statements by customers that they will not do any hedge buying in advance of the new wage increases (and price increases) must be taken with a grain of salt.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,449	1,457	1,538	2,509
Ingot Index				
(1947-1949=100)	90.2	90.7	95.7	156.2
Operating Rates				
Chicago	57.0	58.0	58.0	95.0
Pittsburgh	58.0	58.5*	54.0	100.0
Philadelphia	64.0	62.0	62.0	105.0
Valley	42.0	45.0*	47.0	97.0
West	65.0	63.5*	72.0	105.0
Buffalo	46.0	51.0	54.0	105.0
Cleveland	38.0	36.0*	49.5	98.0
Detroit	53.0	53.0	55.0	103.0
S. Ohio River	44.5	41.0*	64.0	90.0
South	52.0	54.0	58.0	95.5
Upper Ohio R.	58.0	58.0	58.0	103.0
St. Louis	77.0	74.0*	67.0	91.0
Northeast	31.0	31.0	31.0	40.0
Aggregate		54.7	57.0	98.0

*Revised

Prices At a Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.967	5.967	5.967	5.650
Pig Iron (Gross ton)	$66.42	$66.42	$66.42	$62.90
Scrap, No. 1 hvy (Gross ton)	$37.33	$36.67	$33.17	$53.33
No. 2 bundles	$29.17	$28.17	$25.17	$44.33
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	27.10
Copper, electrolytic	25.00	25.00*	25.00	34.00
Lead, St. Louis	12.80	12.80	12.80	15.80
Magnesium ingot	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin Straits, N. Y.	93.00	93.125*	93.50	103.00
Zinc, E. St. Louis	10.00	10.00	10.00	13.50

New Furnaces Offer Economies

Furnace buyers can update equipment to advantage in the current market.

But don't wait too long. A 5 pct price increase may go into effect by midsummer.

▪ Industrial furnace makers believe they may find a few silver linings in the dark clouds of the current business slowdown.

They're convinced that buyers caught in a fierce competitive struggle for sales will replace or up-date heating equipment to get better processing and product.

Industry Opinions — "Our customers may not be planning any large expansion programs," says one furnace builder, "but they're still interested in quality heat treating at reasonable costs. We expect equipment which helps them save furnace space, eliminate handling, cut down fuel costs, and turn out a better product will be more attractive than ever."

"The replacement market," the Industrial Heating Equipment Assn. reports, "appears to the main area for new business in 1958. The lower operating cost of modern equipment, its increased productivity, and its greater quality control will spur modernization projects. This should contribute to a reasonably high level of demand for equipment this year."

Surveys Concur—"A survey of the furnace industry's top management," the association adds, "shows they expect the value of orders in 1958 will decline only 6.6 pct from the 1957 level. If that expectation materializes, the backlog of unfilled orders at the end of 1958 will be greater than at the end of '57."

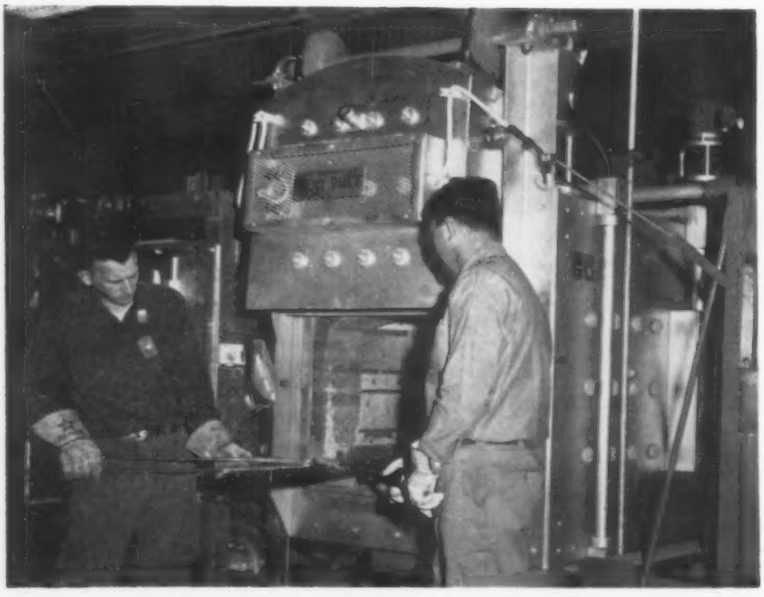
Manufacturers questioned by The IRON AGE supported this viewpoint on sales in 1958. Most believed the new order level would be only 5 to 10 pct below last year's mark. They admit that at the moment business is slow, deliveries are current and competition for orders is keen.

Faster Deliveries—However, they expect an upturn in the second half of the year. One manufacturer has been encouraged by orders in recent weeks slated for tool hardening operations. It feels this reviving of interest in tooling is a healthy economic sign.

Currently the delivery prospect is good for buyers. Shipping estimates of one manufacturer have dropped, depending on the type and size furnace wanted, from a previous 12 to 20 weeks to a present 10 to 18. And it's admitted the 18 might be shaved to 16 without much trouble.

Price Hike Looms—On the question of coming price increases almost all furnace makers agree: There'll be a hike of about 5 pct after mid-year. "Costs of steel, insulating material, heat resisting alloys, and labor, are all trending upward," says a manufacturer, "and there's a definite prospect of higher furnace prices."

Design trends in the heating equipment field are geared to giving customers units doing a better, more precise, job. Makers of protective atmosphere furnaces are striving for closer control of the atmosphere. New resistor materials more impervious to corrosive attacks of atmosphere are being developed. Work is under way to use higher temperature alloys and nonmetallic heating elements in furnace construction.



ATOM AGE MARKET: Typical of changing pattern of furnace needs is this electric unit capable of processing fuel elements for atomic submarines and other power plant installations. (Hevi-Duty Electric Co.)

How the purity of Electromanganese® eliminates steel-making "bargains" that cost money

In theory few metallurgists will argue that pure Electromanganese® makes a better steel additive than manganese alloys that are contaminated with elements detrimental to the finished product.

In practice, however, metallurgists may frequently choose alloys that contain the manganese they want as well as elements they don't want, can't use, and would be better off without! *Their reason*: it's cheaper! *Their problem*: getting rid of the undesirable elements . . . if they can. *The result*: for the most part, adequate but less-than-the-best quality in the finished product.

But let's take a *good* look at the price tag. Are contaminated manganese alloys really cheaper than the pure element? Today's cost difference between other manganese alloys and pure Electromanganese is only a few pennies. This small differential is easily overcome. For example, commercial use of carbon- and silicon-free Electromanganese in low carbon aluminum killed sheet steel shows potential economic and quality advantages in the following areas:

1. Improved furnace and deoxidation practice
2. Improved deep drawing characteristics
3. Improved sheet quality; i.e., fewer surface rejections

RESULT: better quality at lower cost for you and your customers.

When you buy Electromanganese—Foote's electrolytic manganese, guaranteed 99.9% pure—you improve steel quality, cut down rejects, and end up with real dollars-and-cents savings. A Foote engineering representative is ready to tell you about actual case histories in other plants . . . help you work out what you might expect in your own. Until then, Bulletin 201 will give you more details on Electromanganese, the special Hydrogen-Removed Grade (H:7.5ppm), and Nitrided Grades.

Write Technical Literature Department, Foote Mineral Co., 438 Eighteen West Chelten Building, Philadelpha 44, Pa.

Foote MINERAL COMPANY

ELECTROLYTIC MANGANESE METAL • NITRELMANG • HYDROGEN-REMOVED ELECTROMANGANESE • RIMEX MANGANESE SULPHIDE • WELDING GRADE FERRO ALLOYS • COMMERCIAL MINERALS AND ORES LITHIUM METAL, CHEMICALS, MINERALS • ZIRCONIUM, TITANIUM, HAFNIUM (IODIDE PROCESS)

Sharp Spring Upturn Not Likely

Some improvement in the market is expected during the next quarter.

But don't look for any tightening in demand before fall at the earliest.

■ The buyer's market for steel won't disappear with the Spring thaw. Producer hopes for a strong upsurge in ordering during the April-June period appear to be largely wishful thinking.

Mill salesmen confide that only a spurt in automotive steel buying could trigger a large-scale market improvement. They admit Detroit shows no signs of budging from present buying patterns.

Some products, including stainless, tinplate, and wire products, have shown a little more life in recent weeks. But gains for the first two are not spectacular, and wire products were expected to pick up as the spring construction season neared.

Delivery Race Continues—However, buyer pressure for rapid delivery and hand-to-mouth ordering remain for most other products. Competition for sales is keen and business is still often gained or lost on the length of the delivery time quoted.

Brisker buying in the spring will undoubtedly pep up the market. But one thing is clear: Any real strength can't be expected until fall at the earliest.

Stainless Price Reductions—Producers have cut the price of sheet and cold-rolled strip for two types of stainless steel. The adjustments dropped Type 316 sheets and cold-rolled strip by three-fourths of a cent per lb. Type 304 sheets and cold-rolled strip went down by one-half cent a lb. Reductions were first announced by U. S. Steel and Allegheny Ludlum Steel with other producers following. New prices, in cents per lb, are: Type 304: sheet—55.00¢, cold-rolled strip—55.00¢. Type 316: sheet—80.75¢, cold-rolled strip—80.75¢.

Supplier Prices Rebound—Part of the drop made in Los Angeles warehouse steel prices early in December has been restored. Apparently the cuts, as high as $35 in some cases, did not stimulate any more market activity. As a result, a 10 pct increase, amounting to about $15 a ton, was put through the first week in February. The new prices (see p. 181) are still from $5 to $10 a ton below the level existing before the cuts.

Sheet — While February orders are showing no improvement the prospect of more activity in March and April is increasing. An Eastern mill says March orders are coming in at a better clip than were February's this time a month ago. If the present pace continues this producer expects March to reach January levels, a 10 pct improvement over February. Sheet mills in the **Pittsburgh** area are talking about a pickup in April. They haven't given up hope for March but the order intake isn't promising.

Bar—Short deliveries and rush buying continue, although there's some optimism about the market among **Pittsburgh** producers. One reports customers are increasing hot-rolled bar tonnages in February over January and December levels. Two cold finishers there say January orders were over December in one case by about 8 pct. However, the gains are small and the optimism is tempered. Short rolling cycles remain at **Chicago** area mills. Some producers are reported on two-week schedules. One cold finisher apparently lost an order because delivery could not be made in two days. Orders at **Cleveland** are running behind January levels.

Pipe and Tubing—While standard pipe sales increased slightly in January the market is still at reduced levels. Sales of oil country products continue poor. Users are living off inventories and many are talking of orders only in terms of second or third quarter delivery. The linepipe market is showing no improvement. Mechanical specialties are described as picking up in the **Pittsburgh** area. On the **West Coast,** pipe sales are at their lowest ebb in years. Mills are loaded with product in ½ in. to 4 in. sizes.

Wire Products — Merchant wire shipments for February are increased, both over January and over February a year ago. Jobbers are starting to order their spring stocks of product. Orders in the **Midwest** are described as ⅓ better than in January. The new light gage, high tensile types of barbed and fence wire are equalling ¼ the tonnage of the new orders at **Cleveland** mills.

PURCHASING AGENT'S CHECKLIST

Order books of steel strapping producers are fattening. **P. 83**

Research of metal powder makers is broadening their market potential. **P. 86**

How to get more for your ferrous castings dollar. **P. 127**

COMPARISON OF PRICES

(Effective Feb. 11, 1958)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	Feb. 11 1958	Feb. 4 1958	Jan. 14 1958	Feb. 12 1957
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.925¢	4.925¢	4.925¢	4.675¢
Cold-rolled sheets	6.05	6.05	6.05	5.75
Galvanized sheets (10 ga.)	6.60	6.60	6.60	6.30
Hot-rolled strip	4.925	4.925	4.925	4.675
Cold rolled strip	7.17	7.17	7.17	6.870
Plate	5.12	5.12	5.12	4.87
Plates, wrought iron	13.15	13.15	13.15	10.40
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	50.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.30	$10.30	$10.30	$9.95
Tin plates, electro (0.50 lb.)	9.00	9.00	9.00	8.65
Special coated mfg. ternes	9.55	9.55	9.55	9.20
Bars and Shapes: (per pound)				
Merchant bar	5.425¢	5.425¢	5.425¢	5.075¢
Cold finished bars	7.30	7.30	7.30	6.85
Alloy bars	6.475	6.475	6.475	6.125
Structural shapes	5.275	5.275	5.275	5.00
Stainless bars (No. 302)	45.00	45.00	45.00	43.25
Wrought iron bars	14.45	14.45	14.45	11.50
Wire: (per pound)				
Bright wire	7.65¢	7.65¢	7.65¢	7.20¢
Rails: (per 100 lb.)				
Heavy rails	$5.525	$5.525	$5.525	$5.075
Light rails	6.50	6.50	6.50	6.00
Semifinished Steel: (per net ton)				
Rerolling billets	$77.50	$77.50	$77.50	$74.00
Slabs, rerolling	77.50	77.50	77.50	74.00
Forging billets	96.00	96.00	96.00	91.50
Alloy blooms, billets, slabs	114.00	114.00	114.00	107.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.15¢	6.15¢	6.15¢	5.80¢
Skelp	4.875	4.875	4.875	4.225
Finished Steel Composite: (per pound)				
Base price	5.967¢	5.967¢	5.967¢	5.650¢

	Feb. 11 1958	Feb. 4 1958	Jan. 14 1958	Feb. 12 1957
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.50	$70.51	$70.51	$66.88
Foundry, Valley	66.50	66.50	66.50	63.00
Foundry, Southern Cin'ti	71.65	71.65	71.65	67.17
Foundry, Birmingham	62.50	62.50	62.50	59.00
Foundry, Chicago	66.50	66.50	66.50	63.00
Basic, del'd Philadelphia	70.01	70.01	70.01	66.38
Basic, Valley furnace	66.00	66.00	66.00	62.50
Malleable, Chicago	66.50	66.50	66.50	63.00
Malleable, Valley	66.50	66.50	66.50	63.00
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.75
Pig Iron Composite: (per gross ton)				
Pig iron	$66.42	$66.42	$66.42	$62.90
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$36.50	$36.50	$32.50	$53.50
No. 1 steel, Phila. area	38.00	38.00	36.50	57.50
No. 1 steel, Chicago	**37.50**	35.50	30.50	49.00
No. 1 bundles, Detroit	**29.50**	28.50	21.50	45.50
Low phos., Youngstown	38.50	38.50	35.50	53.50
No. 1 mach'y cast, Pittsburgh	49.50	49.50	49.50	56.50
No. 1 mach'y cast, Phila.	47.50	47.50	47.50	57.50
No. 1 mach'y cast, Chicago	**49.50**	48.50	45.50	50.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	**$37.33**	$36.67	$33.17	$53.33
No. 2 bundles	**29.17**	28.17	25.17	44.33
Coke Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$15.38
Foundry coke, prompt	$17.50-$19	$17.50-$19	$17.50-$19	$17.50-19
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	25.00	**25.00**	**25.00**	**34.00**
Copper, Lake, Conn.	25.00	25.00	25.00	34.00
Tin, Straits, N. Y.	93.00†	93.125*	93.50	103.00
Zinc, East St. Louis	10.00	10.00	10.00	13.50
Lead, St. Louis	12.80	12.80	12.80	15.80
Aluminum, virgin ingot	28.10	28.10	28.10	27.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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IRON AND STEEL SCRAP MARKETS

Market Needs Mill Support

Unless mills come into the market with greater strength, the recent uptrend may be short lived.

Suspicion is growing that higher prices have been based more on dealer reluctance than real demand from the mills.

▪ Lack of strong mill support for new, higher price levels casts a small shadow of doubt over the rising market.

Most significant recent increases were on the basis of bidding for industrial lists. To date, these have not been followed up by heavy mill buying in all cases, although some support has materialized.

Dealers continue to hold out for higher prices. In some markets, the suspicion is growing that the apparent firming of the market is based more on dealer resistance than stronger demand.

Even in Chicago, where advances have been most significant, there is some opinion that the rise will be of short duration. On the West Coast, a recent $2 jump is already unsteady.

The trade has been saying for months that any significant buy will have to bring higher prices. This has proved to be the case, but buys have been too few to sustain a strong uptrend.

Unless new mill purchases materialize, the market's recent upturn may be short.

Pittsburgh — Is there any real support for the recent upturn in prices here? Sellers and buyers of scrap are beginning to ask that question in the face of continued low steel production rates and only slight mill interest in new purchases. Practically all the tonnages moved here have been in relatively small lots on a hit-and-run basis. The firming up of prices appears to reflect more dealer reluctance to part with high-priced inventories than genuine market improvement. Significant mill demand is simply not in the works for the moment.

Chicago—Prices moved up $1 to $3 on scattered purchases by major and smaller mills. Broker buying continues strong. Dealers report low scrap stocks, and movement continues slow. Vague indications that there might be a weakening continue, but have produced no sales at lower prices. Broker buying continues at a very high level. No. 2 dealer bundles also spurted sharply, as did some electric furnace material.

Philadelphia—This market is all export. Foreign buyers had to pay higher prices for scrap to draw enough from the district to fill cargoes. This gives an undertone of strength to domestic prices. It's responsible for an upward adjustment in low phos and heavy turnings.

New York — All steelmaking grades are up $1 in a slightly tighter market. Brokers are having trouble getting material, pointing to higher prices if any sizeable buys are made. Mixed yard cast is up $3 on a sale.

Detroit — Some purchases of several grades of scrap reflected the higher industrial prices of the previous week. Most significant aspect of the sales is the fact that support came from several sectors, including a local mill, Canada, and an Ohio mill.

Cleveland — The market continues to gain strength on speculation and price hold-outs by dealers. New Valley orders in the $38 to $39 range are difficult to cover and some brokers are paying almost their selling price to do so.

St. Louis—A leading mill upped its prices $1 on heavy melting steel and bundles for shipment during January. Turnings and borings are up $1 on outside buying and rail items are also $1 higher, largely because of scarcity.

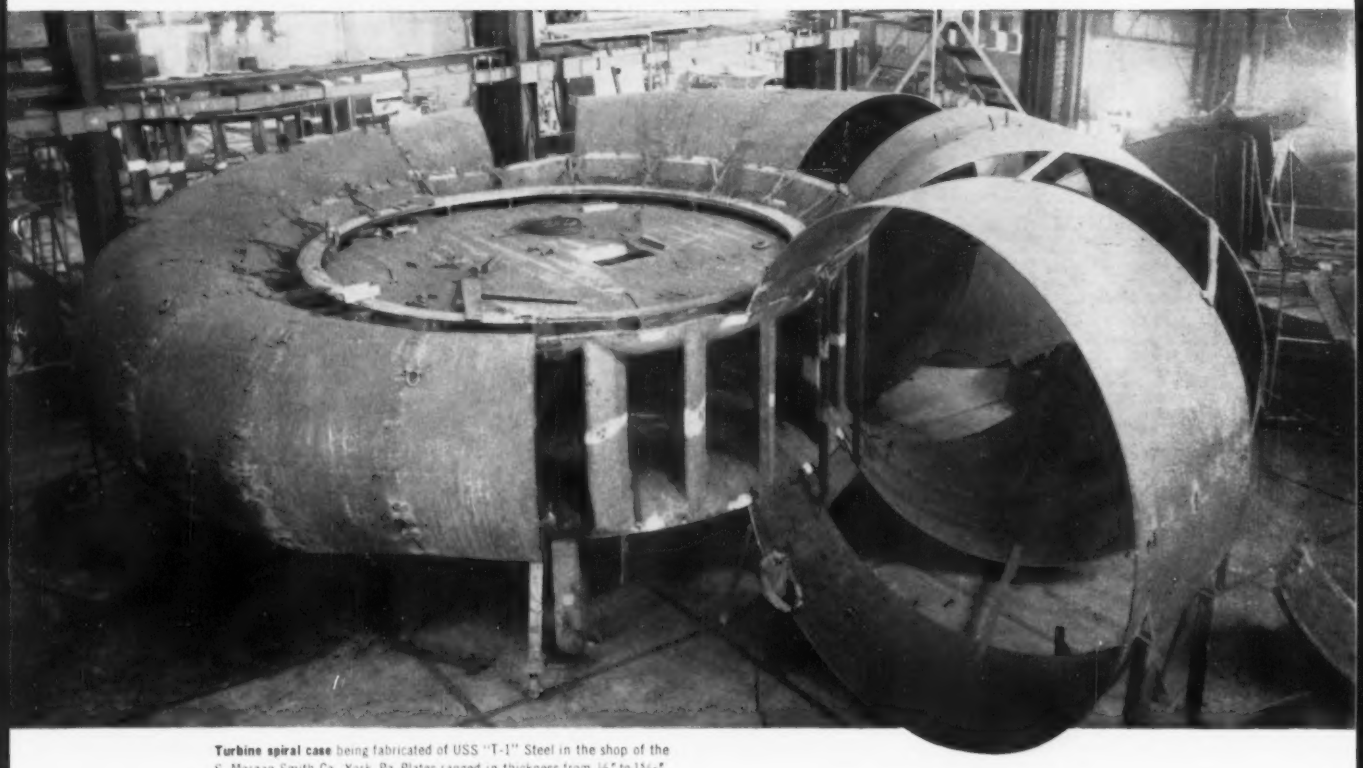
Birmingham—An Alabama mill bought openhearth scrap prices $1 or more per ton over last quotations. It was the first purchase by this mill for some items in several months. The export market is a little stronger, with No. 2 heavy melting bringing $32 a ton at some Gulf ports.

Cincinnati — The local market remains a stalemate as dealers hold out for price against local mills. Occasional shipments are going into the Chicago market and others to the Valley.

Buffalo—A small sale of No. 1 cupola cast was the only activity in the area last week. The sale raised the price to $40 to $41. The price of No. 1 machinery cast also rose in sympathy. Other prices are unchanged.

Boston — For the third consecutive week, prices of No. 1 grades edged up. However, there is little activity in the area, with price increases for the most part reflecting higher prices in adjacent markets.

West Coast — Last week's $2 hike in Los Angeles doesn't appear too firm. Some scrap is being accumulated for foreign shipment out of Los Angeles and Seattle.



Turbine spiral case being fabricated of USS "T-1" Steel in the shop of the S. Morgan Smith Co., York, Pa. Plates ranged in thickness from ½" to 1 5/16".

Taming the mighty Snake River with turbine spiral cases of USS "T-1" Steel

Stronger steel reduces weight . . . cuts costs

Four of these huge spiral cases are being built for the Idaho Power Commission for use in the Brownlee Dam on the Snake River near Robinette, Oregon. They are designed for a 250-foot head of water. The inlet is 18 feet in diameter and each turbine will generate 144,000 horsepower at a speed of 128.6 rpm. Water will flow through the cases at a rate of 5,640 cubic feet per second.

Because of the fierce pressure, it was obvious that a strong steel was required. USS "T-1"* Steel was selected because it has a minimum yield strength of 90,000 psi. What's more, it can be fabricated, is readily weldable and has high resistance to impact abrasion.

Cost savings. By using USS "T-1" Steel, there will be substantially less shipping weight across the country and less weld time and weld metal, both in the shop and on the job site. Had carbon steel been specified, double thicknesses would have been required.

Fabricating operations. Projection of the dimensional outline on the plates was done with Lumitrace. Plates were cut to size by flame-cutting and rolled cold to shape. Some parts were finish welded, others were tack welded and assembled. The spiral case was then disassembled and shipped. Finish welding of segments is to be done at the dam site.

This job points up the economies possible with the use of USS "T-1" Steel. Why not use it for your own equipment? Write for our "T-1" book containing complete information. United States Steel Corporation, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

Remember that we also make USS COR-TEN*, USS TRI-TEN* and USS MAN-TEN* Steels . . . widely used in power generation equipment.

*Registered trademarks

USS United States Steel

SCRAP PRICES *(Effective Feb. 11, 1958)*

Pittsburgh

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	38.00 to 39.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and ms. turn.	17.00 to 18.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	21.00 to 22.00
Low phos. punch'gs plate	39.00 to 40.00
Heavy turnings	35.00 to 36.00
No. 1 RR hvy melting	41.00 to 42.00
Scrap rails, random lgth.	50.00 to 51.00
Rails 2 ft and under	55.00 to 56.00
RR steel wheels	48.00 to 49.00
RR spring steel	48.00 to 49.00
RR couplers and knuckles	48.00 to 49.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	37.00 to 38.00

Chicago

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	38.00 to 39.00
No. 1 factory bundles	41.00 to 42.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	23.00 to 24.00
Low phos. forge crops	51.00 to 52.00
Low phos. punch'gs plate	47.00 to 48.00
Low phos. 3 ft and under	44.00 to 45.00
No. 1 RR hvy. melting	41.00 to 42.00
Scrap rails, random lgth.	50.00 to 51.00
Rerolling rails	56.00 to 57.00
Rails 2 ft and under	58.00 to 59.00
Locomotive tires cut	51.00 to 52.00
Cut bolsters & side frames	48.00 to 49.00
Angles and splice bars	53.00 to 54.00
RR steel car axles	55.00 to 56.00
RR couplers and knuckles	49.00 to 50.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	40.00 to 41.00
Cast iron brake shoe	40.00 to 41.00
Cast iron wheels	39.00 to 40.00
Malleable	53.00 to 54.00
Stove plate	40.00 to 41.00
Steel car wheels	50.00 to 51.00

Philadelphia Area

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	37.50 to 38.50
No. 2 bundles	27.00 to 28.00
No. 1 busheling	37.50 to 38.50
Machine shop turn.	20.00 to 21.00
Mixed bor. short turn.	21.00 to 22.00
Cast iron borings	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Clean cast. chem. borings	30.00 to 31.00
Low phos. 5 ft and under	42.00 to 43.00
Low phos. 2 ft and under	43.00 to 44.00
Low phos. punch'gs	43.00 to 44.00
Elec. furnace bundles	39.00 to 40.00
Heavy turnings	33.00 to 34.00
RR steel wheels	45.00 to 46.00
RR spring steel	45.00 to 46.00
Rails 18 in. and under	58.00 to 60.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	40.00 to 41.00
Malleable	57.00 to 58.00
Unstripped motor blocks	32.00 to 33.00
No. 1 machinery cast.	47.00 to 48.00

Cleveland

No. 1 hvy. melting	$33.50 to $34.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	33.50 to 34.50
No. 1 factory bundles	36.00 to 37.00
No. 2 bundles	23.00 to 24.00
No. 1 bushelings	33.50 to 34.50
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Cut struct'r'l & plates, 2 ft & under	39.00 to 40.00
Drop forge flashings	33.50 to 34.50
Low phos. punch'gs, plate	34.50 to 35.50
Foundry steel, 2 ft & under	36.00 to 37.00
No. 1 RR heavy melting	42.00 to 43.00
Rails 2 ft and under	56.00 to 57.00
Rails 18 in. and under	57.00 to 58.00
Railroad grate bars	17.00 to 18.00
Steel axle turnings	18.00 to 19.00
Railroad cast.	49.00 to 50.00
No. 1 machinery cast.	48.00 to 49.00
Stove plate	45.00 to 46.00
Malleable	61.00 to 62.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	37.50 to 38.50
No. 2 bundles	26.00 to 27.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. plate	38.00 to 39.00

Buffalo

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	25.50 to 26.50
No. 1 busheling	28.00 to 29.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	22.50 to 23.50
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	14.00 to 15.00
Low phos. plate	34.00 to 35.00
Scrap rails, random lgth.	40.00 to 41.00
Rails 2 ft and under	50.00 to 51.00
RR steel wheels	37.00 to 38.00
RR spring steel	33.00 to 34.00
RR couplers and knucklers	33.00 to 34.00
No. 1 machinery cast.	45.00 to 46.00
No. 1 cupola cast.	40.00 to 41.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	28.00 to 29.00
Drop forge flashings	25.00 to 26.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	11.00 to 12.00
Cast iron borings	11.00 to 12.00
Low phos. punch'gs plate	28.00 to 29.00
No. 1 cupola cast.	32.00 to 33.00
Heavy breakable cast.	26.00 to 27.00
Stove plate	26.00 to 27.00
Automotive cast.	35.00 to 36.00

St. Louis

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	17.00 to 18.00
Cast iron borings	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
No. 1 RR hvy. melting	37.00 to 38.00
Rails, random lengths	47.00 to 48.00
Rails, 18 in. and under	55.00 to 56.00
Angles and splice bars	47.00 to 48.00
Std. steel car axles	45.00 to 46.00
RR specialties	44.00 to 45.00
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	32.00 to 33.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	38.00 to 39.00
Cast iron car wheels	37.00 to 38.00
Rerolling rails	54.00 to 55.00
Unstripped motor blocks	33.00 to 34.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	17.50 to 18.50
No. 1 busheling	24.00 to 25.00
Elec. furnace, 3 ft & under	31.00 to 32.00
Machine shop turn.	9.50 to 10.50
Mixed bor. and short turn.	9.50 to 10.50
Shoveling turnings	11.00 to 12.00
Clean cast. chem. borings	16.00 to 17.00
No. 1 machinery cast.	32.00 to 33.00
Mixed cupola cast.	28.00 to 29.00
Heavy breakable cast.	27.00 to 28.00
Stove plate	26.00 to 27.00
Unstripped motor blocks	26.00 to 27.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	30.00 to 31.00
No. 2 dealer bundles	25.00 to 26.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	23.00 to 24.00
No. 1 machinery cast.	34.00 to 35.00
Mixed yard cast.	32.00 to 33.00
Charging box cast.	30.00 to 31.00
Heavy breakable cast.	30.00 to 31.00
Unstripped motor blocks	27.00 to 28.00

Birmingham

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	23.00 to 24.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	12.00 to 13.00
Electric furnace bundles	36.00 to 37.00
Elec. furnace, 3 ft & under	35.00 to 36.00
Bar crops and plate	39.00 to 40.00
Structural and plate, 2 ft	39.00 to 40.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	42.00 to 43.00
Rails, 18 in. and under	49.00 to 50.00
Angles & splice bars	42.00 to 43.00
Rerolling rails	45.00 to 46.00
No. 1 cupola cast.	49.00 to 50.00
Stove plate	49.00 to 50.00
Charging box cast.	22.00 to 23.00
Cast iron car wheels	36.00 to 37.00
Unstripped motor blocks	39.00 to 40.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.50 to 25.50
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	15.00 to 16.00
Low phos, 18 in. and under	38.00 to 39.00
Rails, random length	44.00 to 45.00
Rails, 18 in. and under	54.00 to 55.00
No. 1 cupola cast.	38.00 to 39.00
Hvy. breakable cast.	33.00 to 34.00
Drop broken cast.	47.00 to 48.00

San Francisco

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	30.00
No. 1 dealer bundles	28.00
No. 2 bundles	22.00
Machine shop turn	15.00
Cast iron borings	15.00
No. 1 RR hvy. melting	32.00
No. 1 cupola cast.	40.00

Los Angeles

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	32.00
No. 1 dealer bundles	30.00
No. 2 bundles	22.00
Machine shop turn	$9.00 to 11.00
Shoveling turnings	11.00
Cast iron borings	11.00
Elec. furn. 1 ft and under (foundry)	45.00
No. 1 RR hvy. melting	34.00
No. 1 cupola cast	38.00

Seattle

No. 1 hvy. melting	$30.00
No. 2 hvy. melting	28.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	27.00
No. 1 dealer bundles	32.00
No. 2 bundles	24.00
Mixed steel scrap	27.00
Busheling	22.00
Bush., new fact, prep'd	32.00
Bush., new fact, unprep'd	26.00
Machine shop turn.	17.00
Short steel turn.	21.00
Mixed bor. and turn.	17.00
Rails, rerolling	41.00
Cast scrap	$44.00 to 47.00

Wah Chang to Smelt Indonesian Tin

Texas City smelter, formerly the world's largest, will start smelting tin again in April.

Concentrates will come from Indonesia.

Russian tin can now be sold on London Metals Exchange.

▪ The Texas City tin smelter will start turning out tin again sometime in late March or early April.

An agreement has been made between the Indonesian government and the Wah Chang Corp., owner of the smelter, for refining large quantities of Indonesian concentrates. How much will be involved, and what will happen to the metal has not been revealed.

Toll Smelting—Market observers say most likely the tin will be smelted by Wah Chang on a toll arrangement. It will probably be labeled with the Indonesian government's trademark, Banka, and sold through their American sales agents.

Tuthill & Co., Inc., Banka U. S. agents, professes no knowledge of plans for selling the Texas City tin. However, the company has been the exclusive agents for Banka tin and ore in this country for 30 years.

Smaller Output — The smelter, formerly the world's largest, has been idle since Wah Chang bought it in January 1957. Engineers have been reworking the war baby to operate economically on smaller tonnages, and to handle other metals as well.

Even a fraction of its former output would be a significant amount of tin. But moving through normal trade channels, as most tin traders expect, it would not alter basically the condition of the tin market in the U. S. The only advantage in buying this tin would be a freight savings for a consumer located closer to Texas City than New York.

Russian Tin—More likely to affect the world tin market is the news that Russian tin will be traded on the London Metals Exchange.

The Russians are not members of the International Tin Council, and are not bound by any of the regulations. Members must cut exports in the first half by 40 pct, and must make contributions to the buffer stock, either cash or tin.

Last year Russia sold 12,000 long tons of tin in the free world. There has been more speculation that she will export even more this year.

Zinc

The American Zinc Institute reports both production and shipments of slab zinc in January were off from the previous month, and from January, 1957.

Despite this, stocks of metal on hand at the smelter were up at the end of the month.

Production
Jan. 1958—82,343
Dec. 1957—86,270
Jan. 1957—93,452

Shipments
Jan. 1958—68,657
Dec. 1957—72,128
Jan. 1957—83,100

Stocks at Smelters
Jan. 1958—180,346
Dec. 1957—166,660
Jan. 1957— 78,974
(net tons)

Aluminum

Adjustments in production schedules do not seem to be pushing the market any closer to balance. Demand is still dragging. Secondary ingot prices were cut .25¢ to .50¢ per lb because of the slack demand.

A leading independent extruder says the squeeze in the extrusion market is not caused primarily by oversupply. (The IRON AGE, Feb. 6, p. 58.) He claims the primary producers were discounting extrusions even when metal was tight in 1956.

Nickel

There seems to be a misunderstanding on why Business and Defense Service Administration made the use of ratings mandatory on order for nickel for defense uses. Contrary to some reports, BDSA is not implying continued shortage. It says it simply needs this procedure to keep an account of supply and tonnage used for defense. When nickel was short, the only way to get metal was to use the assigned rating. Lately contractors weren't bothering because it wasn't needed.

Tin prices for the week: Feb. 5—93.50; Feb. 6—93.50; Feb. 7—93.125; Feb. 10—93.00; Feb. 11—93.00*

* Estimate

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum pig	26.00	25.00	8/1/57
Aluminum ingot	28.10	27.10	8/1/57
Copper (E)	25.00	27.00	1/13/58
Copper (CS)	24.00	24.50	1/21/57
Copper (L)	25.00	27.00	1/13/58
Lead, St. L.	12.00	13.30	12/2/57
Lead, N. Y.	13.00	13.50	12/2/57
Magnesium ingot	36.00	34.00	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	200-250	165-250	1/29/58
Zinc, E. St. L.	10.00	10.50	7/1/57
Zinc, N. Y.	10.50	11.00	7/1/57

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig, Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see above; other primary prices, pg. 175.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-.3
1100, 3003	46.6	44.3	43.6	42.7
5052	54.0	48.9	47.2	45.4
6061-0	51.4	47.0	45.2	45.1

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	45.0-46.8	60.4-64.1
12-14	45.7-47.2	61.3-63.8
24-26	49.0-49.5	72.1-76.8
36-38	58.0-58.6	96.2-99.8

Screw Machine Stock—2011-T-3

Size"	¼	⅛-⅜	⅝-1	1¼-1½
Price	63.0	62.5	61.0	58.6

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1,420	$1,893	$2,367	$2,839
.024 gage	1,774	2,366	2,957	3,549

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade		67.9	69.0	77.9	108.1
AZ31B Spec.		93.3	95.7	108.7	171.3
Tread Plate		70.6	71.7		
Tooling Plate	73.0				

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	48.13	.....	45.36	48.32
Brass, 70/30	42.69	43.23	42.63	45.60
Brass, Low	44.90	45.44	44.84	47.71
Brass, R L	45.67	46.21	45.61	48.48
Brass, Naval	47.07	.....	41.38	50.48
Munts Metal	45.19	.....	41.00	.....
Comm. Bs.	46.98	47.52	46.92	49.54
Mang. Bs.	50.81	.....	44.91	.....
Phos. Bs. 5%	67.17	.....	67.67	.....

Free Cutting Brass Rod 31.03

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $9.50-$10.60; alloy, $14.75; Plate, HR, commercially pure, $8.00-$8.75; alloy, $10.75. Wire, rolled and/or drawn, commercially pure, $7.50-$8.00; alloy, $10.00; Bar, HR or forged, commercially pure, $6.15-$6.40; alloy, $6.15-$6.35; billets, HR, commercially pure, $6.00-$6.25; alloy, $6.00-$6.20.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.55
Calcium, 99.9%, small lots ..... $ 4.55
Chromium, 99.8% metallic basis ... $ 1.31
Cobalt, 97-99% (per lb) ..$2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 39.50 to 51.00
Gold, U. S. Treas, per troy oz. $35.00
Indium, 99.9%, dollars per troy oz... $ 2.25
Iridium, dollars per troy oz.... $80 to $90
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $220 to $225
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz... $19 to $21
Platinum, dollars per troy oz... $77 to $80
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.)..... 88.625
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 25.75
- No. 120 ..... 24.75
- No. 123 ..... 24.00

80-10-10 ingot
- No. 305 ..... 29.75
- No. 315 ..... 27.75

88-10-2 ingot
- No. 210 ..... 36.75
- No. 215 ..... 32.50
- No. 245 ..... 29.25

Yellow ingot
- No. 405 ..... 21.25

Manganese bronze
- No. 421 ..... 23.00

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 24.75-25.75
- 0.60 copper max. 24.50-25.50

Piston alloys (No. 122 type) .. 23.75-24.50
No. 12 alum. (No. 2 grade) ... 21.00-21.75
108 alloy 21.25-22.25
195 alloy 24.00-25.50
13 alloy (0.60 copper max.) .. 24.75-25.75
AXS-679 ..... 21.25-22.25

(Effective Feb. 10, 1958)

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 22.00-23.00
Grade 2—92-95% 21.00-21.75
Grade 3—90-92% 20.00-20.75
Grade 4—85-90% 17.50-18.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	21	20¼
Yellow brass	16⅛	14⅛
Red brass	18⅝	17⅞
Comm. bronze	19⅛	18⅛
Mang. bronze	14⅞	14⅛
Yellow brass rod ends	15⅞	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 19
- No. 2 copper wire 17⅛
- Light copper 15¼
- *Refinery brass 17
- Copper bearing material 16⅛

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 19
- No. 2 copper wire 17⅛
- Light copper 15¼
- No. 1 composition 17⅛
- No. 1 comp. turnings 17
- Hvy. yellow brass solids ... 12
- Brass pipe 13⅜
- Radiators 13⅛

Aluminum

- Mixed old cast ..... 12½—13½
- Mixed new clips ..... 14½—15½
- Mixed turnings, dry ..... 13 —14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 17 —17⅛
- No. 2 copper wire ..... 15 —15⅛
- Light copper ..... 13 —13⅛
- Auto radiators (unsweated) .. 11 —11⅛
- No. 1 composition ..... 14½—15
- No. 1 composition turnings .. 13½—14
- Cocks and faucets ..... 11½—12
- Clean heavy yellow brass ... 11 —11⅛
- Brass pipe ..... 12 —12⅛
- New soft brass clippings .... 12½—13
- No. 1 brass rod turnings .... 10 —10⅛

Aluminum

- Alum. pistons and struts .... 5½— 6
- Aluminum crankcases ..... 10 —10½
- 1100 (2S) aluminum clippings 13 —13½
- Old sheet and utensils ..... 10 —10½
- Borings and turnings ..... 6½— 7
- Industrial castings ..... 10 —10½
- 2024 (24S) clippings ..... 11½—12

Zinc

- New zinc clippings ..... 4 — 4½
- Old zinc ..... 3 — 3¼
- Zinc routings ..... 1¾— 2
- Old die cast scrap ..... 1½— 1¾

Nickel and Monel

- Pure nickel clippings 42-45
- Clean nickel turnings 37-40
- Nickel anodes 42-45
- Nickel rod ends 42-45
- New Monel clippings 28-29
- Clean Monel turnings 20-23
- Old sheet Monel 25-26
- Nickel silver clippings, mixed. 18
- Nickel silver turnings, mixed. 15

Lead

- Soft scrap lead ..... 8½— 9
- Battery plates (dry) ..... 3½— 3⅝
- Batteries, acid free ..... 2½— 2⅝

Miscellaneous

- Block tin ..... 75 —76
- No. 1 pewter ..... 59 —60
- Auto babbitt ..... 39 —40
- Mixed common babbitt ..... 11 —11½
- Solder joints ..... 14½—15
- Siphon tops 42
- Small foundry type ..... 12 —12¼
- Monotype ..... 12 —12¼
- Lino. and stereotype ..... 11 —11¼
- Electrotype ..... 10 —10¼
- Hand picked type shells .... 7 — 7½
- Lino. and stereo. dross ..... 3 — 3¼
- Electro dross ..... 2½— 2¾

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$114.00 *B3*		5.325 *B3*	7.80 *B3*	5.325 *B3*						
	Buffalo, N. Y.	$77.50 *R3, B3*	$96.00 *R3, B3*	$114.00 *R3, B3*	6.225 *B3*	5.325 *B3*	7.80 *B3*	5.325 *B3*	4.925 *R3, B3*	7.15 *S10*	7.325 *B3*			
	Phila., Pa.									7.70 *P15*				
	Harrison, N. J.													15.05 *C11*
	Conshohocken Pa.		$101.00 *A2*	$121.00 *A2*					4.975 *A2*	7.20 *A2*	7.325 *A2*			
	New Bedford, Mass.									7.60 *R6*				
	Johnstown, Pa.	$77.50 *B3*	$96.00 *B3*	$114.00 *B3*		5.325 *B3*	7.80 *B3*							
	Boston, Mass.									7.70 *T8*				15.40 *T8*
	New Haven, Conn.									7.60 *D1*				
	Baltimore, Md.									7.15 *T8*				
	Phoenixville, Pa.					5.325 *P2*		5.325 *P2*						
	Sparrows Pt., Md.								4.925 *B3*		7.325 *B3*			
	Bridgeport, Wallingford, Conn.			$114.00 *N8*						7.60 *W1*				
	Pawtucket, R. I. Worcester, Mass.									7.70 *N7* 7.70 *A5*				15.40 *N7* 15.20 *T8*
MIDDLE WEST	Alton, Ill.								5.125 *L1*					
	Ashland, Ky.								4.925 *A7*					
	Canton-Massillon, Dover, Ohio		$96.00 *R3*	$114.00 *R3, T5*						7.15 *G4*		10.45 *G4*		14.85 *C11*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$77.50 *U1, R3*	$96.00 *U1, R3,W8*	$114.00 *U1, R3,W8*	6.225 *U1*	5.275 *U1, W8,P13*	7.75 *U1,Y1 W8*	5.275 *U1*	4.925 *W8, N4,A1*	7.25 *A1,T8 M8*			8.10 *W8, S9,I3*	15.05 *A1, S9,G4*
	Cleveland, Ohio									7.15 *A5,J3*		10.45 *A5*	8.10 *J3*	
	Detroit, Mich.			$114.00 *R3*					5.025 *G3, M2*	7.25 *M2,D1, D2,G3,P11*	7.425 *G3*	10.60 *D2* 10.55 *G3*	8.10 *G3*	
	Anderson, Ind.									7.15 *G4*				
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$77.50 *U1*	$96.00 *U1*	$114.00 *U1, Y1*		5.275 *U1, I3*	7.75 *U1, I3*	5.275 *I3*	4.925 *U1, I3,Y1*	7.15 *Y1*	7.325 *U1, I3,Y1*	10.60 *Y1*	8.10 *U1, Y1*	
	Sterling, Ill.	$77.50 *N4*				5.275 *N4*			5.025 *N4*					
	Indianapolis, Ind.									7.30 *J3*				15.20 *J3*
	Newport, Ky.												8.10 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$96.00 *S1, C10*	$114.00 *C10,S1*					4.925 *R3, S1*	7.15 *R3,T4 S1*	7.325 *R3, S1*	10.50 *S1* 10.45 *R3*	8.10 *S1*	15.05 *S1*
	Owensboro, Ky.	$77.50 *G5*	$96.00 *G5*	$114.00 *G5*										
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Aliquippa, Pa.	$77.50 *U1, P6*	$96.00 *U1, C11,P6*	$114.00 *U1, C11,B7*	6.225 *U1*	5.275 *U1, J3*	7.75 *U1, J3*	5.275 *U1*	4.925 *P6*	7.15 *J3,B4, S7*			8.10 *S9*	15.05 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.225 *W3*	5.275 *W3*			4.925 *W3*	7.15 *W3,F3*	7.325 *W3*	10.50 *W3*		
	Youngstown, Ohio	$77.50 *R3*	$96.00 *Y1, C10*	$114.00 *Y1*			7.75 *Y1*			7.15 *Y1,J3*	7.325 *U1, Y1*	10.65 *Y1*	8.10 *U1, Y1*	15.05 *J3* 10.65 *Y1*
WEST	Fontana, Cal.	$88.00 *K1*	$105.50 *K1*	$135.00 *K1*		6.075 *K1*	8.55 *K1*	6.225 *K1*	5.675 *K1*	9.00 *K1*				
	Geneva Utah		$96.00 *C7*			5.275 *C7*	7.75 *C7*							
	Kansas City, Mo.					5.375 *S2*	7.85 *S2*						8.35 *S2*	
	Los Angeles, Torrance, Cal.		$105.50 *B2*	$134.00 *B2*		5.975 *C7, B2*	8.45 *B2*		5.675 *C7, B2*	9.05 *J3*			9.30 *B2*	17.25 *J3*
	Minnequa, Colo.					5.575 *C6*			6.025 *C6*	9.10 *K1*				
	Portland, Ore.					6.025 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$105.50 *B2*			5.925 *B2*	8.40 *B2*		5.675 *C7, B2*					
	Seattle, Wash.		$109.50 *B2*			6.025 *B2*	8.50 *B2*		5.925 *B2*					
SOUTH	Atlanta, Ga.					5.475 *A8*			5.125 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$77.50 *T2*	$96.00 *T2*			5.275 *T2, R3,C16*	7.75 *T2*		4.925 *T2, R3,C16*		7.325 *T2*			
	Houston, Lone Star, Texas		$101.00 *S2*	$119.00 *S2*		5.375 *S2*	7.85 *S2*						8.35 *S2*	

(Effective Feb. 10, 1958)

STEEL PRICES

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		SHEETS								WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.												
	Buffalo, N. Y.	4.925 *B3*	6.05 *B3*				7.275 *B3*	8.975 *B3*		6.15 *W6*			
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	4.975 *A2*	6.10 *A2*				7.325 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.15 *B3*			
	Fairless, Pa.	4.975 *U1*	6.10 *U1*				7.325 *U1*	9.025 *U1*			$10.15 *U1*	$8.85 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	4.925 *B3*	6.05 *B3*	6.60 *B3*			7.275 *B3*	8.975 *B3*	9.725 *B3*	6.25 *B3*	$10.15 *B3*	$8.85 *B3*	
	Worcester, Mass.									6.45 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.35 *L1*			
	Ashland, Ky	4.925 *A7*		6.60 *A7*	6.625 *A7*								
	Canton-Massillon, Dover, Ohio			6.60 *R3, R1*									
	Chicago, Joliet, Ill.	4.925 *W8, A1*					7.275 *U1*			6.15 *A5, R3, W8, N4, K2*			
	Sterling, Ill.									6.25 *N4, K2*			
	Cleveland, Ohio	4.925 *R3, J3*	6.05 *R3, J3*		6.625 *R3*		7.275 *R3, J3*	8.975 *R3, J3*		6.15 *A5*			
	Detroit, Mich.	5.025 *G3, M2*	6.15 *G3* 6.05 *M2*				7.375 *G3*	9.075 *G3*					
	Newport, Ky	4.925 *A1*	6.05 *A1*										
	Gary, Ind. Harbor, Indiana	4.925 *U1, I3, Y1*	6.05 *U1, I3, Y1*	6.60 *U1, I3*	6.625 *U1, I3, Y1*	7.00 *U1*	7.275 *U1, Y1, I3*	8.975 *U1, Y1*		6.15 *Y1*	$10.05 *U1, Y1*	$8.75 *I3, U1, Y1*	7.50 *U1, Y1*
	Granite City, Ill.	5.125 *G2*	6.25 *G2*	6.80 *G2*	6.825 *G2*							$8.85 *G2*	7.60 *G2*
	Kokomo, Ind.			6.70 *C9*		7.00 *E2*				6.25 *C9*			
	Mansfield, Ohio		6.05 *E2*			7.00 *A7*							
	Middletown, Ohio		6.05 *A7*	6.60 *A7*	6.625 *A7*	7.00 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	4.925 *R3, N3, S1*	6.05 *R3*	6.60 *R3*	6.625 *N3, S1*	7.00 *N3, S1, R3*	7.275 *R3*	8.975 *S1, R3*				$8.75 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Donora, Pa. Aliquippa, Pa.	4.925 *U1, J3, P6*	6.05 *U1, J3, P6*	6.60 *U1, J3*	6.625 *U1*		7.275 *U1, J3*	8.975 *U1, J3*	9.725 *U1*	6.15 *A5, J3, P6*	$10.05 *U1, J3*	$8.75 *U1, J3*	7.50 *U1, J3*
	Portsmouth, Ohio	4.925 *P7*	6.05 *P7*							6.15 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.925 *W3, W5*	6.05 *W3, F3, W5*	6.60 *W3, W5*		7.00 *W3, W5*	7.275 *W3*	8.975 *W3*			$10.05 *W3, W5*	$8.75 *W3, W5*	7.50 *W5*
	Youngstown, Ohio	4.925 *U1, Y1*	6.05 *Y1*		6.625 *Y1*		7.275 *Y1*	8.975 *Y1*		6.15 *Y1*			
WEST	Fontana Cal.	5.675 *K1*	7.30 *K1*				8.025 *K1*	10.275 *K1*			$10.80 *K1*	$9.50 *K1*	
	Geneva, Utah	5.025 *C7*											
	Kansas City, Mo.									6.40 *S2*			
	Los Angeles, Torrance, Cal.									6.95 *B2*			
	Minnequa, Colo.									6.40 *C6*			
	San Francisco, Niles, Pittsburgh, Cal.	5.625 *C7*	7.00 *C7*	7.35 *C7*						6.95 *C7*	$10.80 *C7*	$9.50 *C7*	
	Seattle, Wash.												
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	4.925 *T2, R3*	6.05 *T2, R3*	6.60 *T2, R3*						6.15 *T2, R3*	$10.15 *T2*	$8.85 *T2*	
	Houston, Tex.									6.40 *S2*			

† Special coated mfg. terne deduct 50c from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box.

* COKES: 1.50-lb. add 25c. ELECTRO: 0.50-lb. add 25c; 0.75-lb. add 65c; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65c.

(Effective Feb. 10, 1958)

STEEL PRICES

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		BARS						PLATES				WIRE
		Carbon† Steel	Reinforc-ing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low -Alloy	Mfrs'. Bright
EAST	Bethlehem, Pa.				6.475 *B3*	8.775 *B3*	7.925 *B3*					
	Buffalo, N. Y.	5.425 *R3,B3*	5.425 *R3,B3*	7.35 *B5*	6.475 *B3,R3*	8.775 *B3,B5*	7.925 *B3*	5.10 *B3*		7.20 *B3*		7.65 *W6*
	Claymont, Del.							5.10 *C4*		7.20 *C4*	7.625 *C4*	
	Coatesville, Pa.							5.10 *L4*		7.20 *L4*	7.925 *L4*	
	Conshohocken, Pa.							5.20 *A2*	6.175 *A2*	7.20 *A2*	7.625 *A2*	
	Harrisburg, Pa.							5.10 *P2*	6.275 *P2*			
	Milton, Pa.	5.575 *M7*	5.575 *M7*									
	Hartford, Conn.			7.80 *R3*		9.075 *R3*	7.925 *B3*					
	Johnstown, Pa.	5.425 *B3*	5.425 *B3*		6.475 *B3*			5.10 *B3*		7.20 *B3*	7.625 *B3*	7.65 *B3*
	Fairless, Pa.	5.575 *U1*	5.575 *U1*		6.625 *U1*							
	Newark, N. J. Camden, N. J.			7.75 *W10* 7.75 *P10*		8.95 *W10* 8.95 *P10*						
	Bridgeport, Conn. Putnam, Conn. Willimantic, Conn.			7.85 *W10* 7.80 *J3*	6.55 *N8*	8.925 *N8*						
	Sparrows Pt., Md.		5.425 *B3*					5.10 *B3*		7.20 *B3*	7.625 *B3*	7.75 *B3*
	Palmer, Worcester, Readville, Mass. Mansfield, Mass.			7.85 *B5,C14*		9.075 *A5,B5*						7.95 *A5, W6*
	Spring City, Pa.			7.75 *K4*		8.95 *K4*						
MIDDLE WEST	Alton, Ill.	5.625 *L1*										7.85 *L1*
	Ashland, Newport, Ky.							5.10 *A7,A1*		7.20 *A1*		
	Canton, Massillon, Ohio			7.30 *R3,R2*	6.475 *R3,T5*	8.775 *R3,R2, T5*						
	Chicago, Joliet, Waukegan, Ill. Harvey, Ill.	5.425 *U1,R3, W8,N4,P13*	5.425 *U1,R3, N4,P13*	7.30 *A5, W10,W8 B5,L2,N9*	6.475 *U1,R3, W8*	8.775 *A5, W10,W8 L2,N8,B5*	7.925 *U1,W8*	5.10 *U1,A1, W8,I3*	6.175 *U1*	7.20 *U1,W8*	7.625 *U1,W8*	7.65 *A5,R3, W8,N4, K2,W7*
	Cleveland, Ohio Elyria, Ohio	5.425 *R3*	5.425 *R3*	7.30 *A5,C13 C18*		8.775 *A5, C13, C18*	7.925 *R3*	5.20 *R3,J3*	6.175 *J3*		7.625 *R3, J3*	7.65 *A5, C13*
	Detroit, Mich.	5.525 *G3*	5.775 *G3*	7.55 *P3* 7.50 *P8,B5*	6.475 *R3* 6.575 *G3*	8.775 *R3* 8.975 *B5,P3, P8*	8.025 *G3*	5.20 *G3*		7.35 *G3*		
	Duluth, Minn.											7.65 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.425 *U1,I3, Y1*	5.425 *U1,I3, Y1*	7.30 *R3,J3*	6.475 *U1,I3, Y1*	8.775 *R3,M4*	7.925 *U1, Y1*	5.10 *U1,I3, Y1*	6.175 *J3,I3*	7.20 *U1,Y1*	7.625 *U1, Y1,I3*	7.75 *M4*
	Granite City, Ill.							5.30 *G2*				
	Kokomo, Ind											7.75 *C9*
	Sterling, Ill.	5.525 *N4*	5.525 *N4*					5.10 *N4*				7.75 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.30 *C10*	6.475 *C10,S1*	8.775 *C10*	7.925 *S1*	5.10 *R3,S1*		7.20 *S1*	7.625 *R3, S1*	
	Owensboro, Ky.	5.425 *G5*			6.475 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.425 *U1,J3*	5.425 *U1,J3*	7.30 *A5,B4, R3,J3,C11, W10,S9,C8*	6.475 *U1,J3, C11,B7*	8.775 *A5, W10,R3,S9, C11,C8*	7.925 *U1,J3*	5.10 *U1,J3*	6.175 *U1*	7.20 *U1,J3, B7*	7.625 *U1,J3, B7*	7.65 *A5, J3,P6*
	Portsmouth, Ohio											7.65 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.10 *W5*				
	Youngstown, Ohio	5.425 *U1,R3, Y1*	5.425 *U1,R3, Y1*	7.30 *A5,Y1, F2*	6.475 *U1,Y1*	8.775 *Y1,F2*	7.925 *U1,Y1*	5.10 *U1,R3, Y1*		7.20 *Y1*	7.625 *U1, R3,Y1*	7.65 *Y1*
WEST	Emeryville, Cal. Fontana, Cal.	6.175 *J5* 6.125 *K1*	6.175 *J5* 6.125 *K1*		7.525 *K1*		8.625 *K1*	5.90 *K1*		8.00 *K1*	8.425 *K1*	
	Geneva, Utah							5.10 *C7*			7.625 *C7*	
	Kansas City, Mo.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*					7.90 *S2*
	Los Angeles, Torrance, Cal.	6.125 *C7,B2*	6.125 *C7,B2*	8.75 *R3,P14*	7.525 *B2*	10.65 *P14*	8.625 *B2*					8.60 *B2*
	Minnequa, Colo.	5.875 *C6*	5.875 *C6*					5.95 *C6*				7.90 *C6*
	Portland, Ore.	6.175 *O2*	6.175 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.125 *C7* 6.175 *B2*	6.125 *C7* 6.175 *B2*				8.675 *B2*					8.60 *C7,C6*
	Seattle Wash.	6.175 *B2,N6*	6.175 *B2*				8.675 *B2*	6.00 *B2*		8.10 *B2*	8.525 *B2*	
SOUTH	Atlanta, Ga.	5.625 *A8*	5.625 *A8*									7.85 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.425 *T2,R3, C16*	5.425 *T2,R3, C16*	7.90 *C16*			7.925 *T2*	5.10 *T2,R3*			7.625 *T2*	7.65 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*	5.20 *S2* 5.20 *L3*		7.30 *S2*	7.725 *S2*	7.90 *S2*

(Effective Feb. 10, 1958)

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 J. & L. Steel Co., Stainless Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Youngstown *R3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fontana *K1*	+8.25	+23.5	+5.25	+19.5	+1.75	+15.00	0.75	+14.25	1.25	+13.25	1.75	+12.75	3.25	+13.00								
Pittsburgh *J3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	+9.25	+24.25	+2.75	+19.50	+0.25	+17.0	1.25	+15.50
Alton, Ill. *L1*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Sharon *M3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fairless *N2*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Pittsburgh *N1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	+9.25	+24.25	+2.75	+19.50	+0.25	+17.0	1.25	+15.50
Wheeling *W5*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Wheatland *W4*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Youngstown *Y1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	+9.25	+24.25	+2.75	+19.50	+0.25	+17.0	1.25	+15.50
Indiana Harbor *Y1*	4.25	+11.0	7.25	+7.0	10.75	+2.50	13.25	+1.75	13.25	+0.75	14.25	+0.25	15.75	+1.00								
Lorain *N2*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	+9.25	+24.25	+2.75	+19.50	+0.25	+17.0	1.25	+15.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Youngstown *R3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Fairless *N2*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Fontana *K1*	+3.75		0.25		3.25		3.75		4.25		4.75		5.25									
Pittsburgh *J3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	+7.75	+21.75	+0.25	+16.0	2.25	+13.50	7.25	+8.50
Alton, Ill. *L1*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Sharon *M3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Pittsburgh *N1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	+7.75	+21.75	+0.25	+16.0	2.25	+13.50	7.25	+8.50
Wheeling *W5*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Wheatland *W4*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Youngstown *Y1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	+7.75	+21.75	+0.25	+16.0	2.25	+13.50	7.25	+8.50
Indiana Harbor *Y1*	8.75	+5.0	12.75	+1.0	15.75	3.50	16.25	2.25	16.75	3.25	17.25	3.75	17.75	2.50								
Lorain *N2*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	+7.75	+21.75	+0.25	+16.0	2.25	+13.50	7.25	+8.50

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 10¢ per lb.

(Effective Feb. 10, 1958)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.795	T-1
18	4	1	—	5	2.50	T-4
18	4	2	—	—	1.96	T-2
1.5	4	1.5	8	—	1.155	M-1
6	4	3	6	—	1.545	M-3
6	4	2	5	—	1.30	M-2
High-carbon chromium					.925	D-3, D-5
Oil hardened manganese					.475	O-2
Special carbon					.36	W-1
Extra carbon					.36	W-1
Regular carbon					.305	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4, C4*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302				37.50
	304	37.95	42.25	46.70	40.00
	316	44.40	49.50	54.50	58.75
	321	40.05	44.60	49.30	47.25
	347	42.40	47.55	52.80	57.00
	405	29.85	33.35	36.85	.....
	410	29.55	33.10	36.70	.....
	430	29.80	33.55	37.25	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 40.25; 1 side, 33.95.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.525	6.50	6.975				14.75
Cleveland *R3*				9.75			
So. Chicago *R3*							
Ensley *T2*	5.525	6.50					
Fairfield *T2*		6.50		9.75		6.60	
Gary *U1*	5.525					6.60	
Huntington *C16*		6.50					
Ind. Harbor *I3*	5.525		6.975	9.75		6.60	
Ind. Harbor *Y1*				9.75			
Johnstown *B3*		6.50					
Joliet *U1*			6.975				14.75
Kansas City *S2*				9.75			
Lackawanna *B3*	5.525	6.50	6.975			6.60	
Lebanon *B3*			6.975		14.50		14.75
Minnequa *C6*	5.525	7.00	6.975	9.75		6.60	14.75
Pittsburgh *P5*							14.75
Pittsburgh *J3*				9.75			
Seattle *B2*				10.25		6.75	15.75
Steelton *B3*	5.525		6.975			6.60	
Struthers *Y1*				9.75			
Torrance *C7*						6.75	
Williamsport *S5*		6.50					
Youngstown *R3*				9.75			

COKE

Furnace, beehive (f.o.b.) Connellsville, Pa.	Net-Ton $15.00 to $15.75
Foundry, beehive (f.o.b.)	$17.50 to $19.00
Foundry oven coke	
Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Is., Pa.	29.25

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field		9.625	
Armature	11.10	10.85	11.35
Elect.	11.80	11.55	12.05
Special Motor		12.10	
Motor	12.90	12.65	13.15
Dynamo	13.95	13.70	14.20
Trans. 72	15.00	14.75	15.25
Trans. 65	15.55		
		Grain Oriented	
Trans. 58	16.05	Trans. 66	20.20
Trans. 52	17.10	Trans. 80	19.20
		Trans. 73	19.70

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N5*); Vandergrift (*U1*); Warren, O. (*R5*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	26.00	40	100,110	10.70
20	72	25.25	35	110	10.70
18	72	25.75	30	110	10.85
14	72	25.75	24	72 to 84	11.25
12	72	26.25	20	90	11.00
10	60	28.00	17	72	11.40
10	48	28.50	14	72	11.85
7	60	28.25	12	60	12.95
6	60	31.50	10	60	13.00
4	40	35.00	8	60	13.30
3	40	37.00			
2½	30	39.25			
2	24	60.75			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$135.00
No. 1 Ohio	120.00
Sec. Quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$150.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	157.00-160.00
Silica cement, net ton, bulk, Latrobe	28.50
Silica cement, net ton, bulk, Chicago	25.50
Silica cement, net ton, bulk, Ensley, Ala.	26.50
Silica cement, net ton, bulk, Mt. Union	24.50
Silica cement, net ton, bulk, Utah and Calif.	37.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$105.00
Standard chemically bonded, Curtiner, Calif.	115.00
Burned, Balt.	99.00

Magnesite Brick

Standard Baltimore	$131.00
Chemically bonded, Baltimore	116.00

Grain Magnesite

St. ¾ to ⅛-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Midwest	17.00
Missouri Valley	15.00

(Effective Feb. 10, 1958)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢ lb.	Merch. Wire Galv. ¢ lb.
Alabama City *R3*	173	187		212	193		8.65	9.20
Aliquippa *J3***	173	190			190		8.65	9.325
Atlanta *A8***	175	192		214	198		8.75	9.425
Bartonville *K2***	175	192	178	214	198		8.75	9.425*‡
Buffalo *W6*							8.65	8.95*
Chicago *N4*****	173	190	172	212	196		8.65	9.325
Cleveland *A6*	....							
Cleveland *A5*							8.65	
Crawf'dav. *M4***	175	192		214	198		8.75	9.425
Donora, Pa. *A5*	173	187		212	193		8.65	9.20
Duluth *A5*	173	187		212	193		8.65	9.20
Fairfield, Ala. *T2*	173	187		212	193		8.65	9.20
Galveston *D4*	9.10‡							
Houston *S2*	178	192		217	198		8.90	9.45
Jacksonville *M4*	184	197		219	203		9.00	9.675
Johnstown *B3***	173	190	172		196***		8.65	9.325*‡
Joliet, Ill. *A5*	173	187		212	193		8.65	9.20
Kokomo *C9**	175	189		214	195*		8.75	9.30*
L. Angeles *B2*****							9.60	10.275
Kansas City *S2**	178	192		217	198*		8.90	9.45*
Minnequa *C6†*	178	192	177	217	198†		8.90	9.45†
Monessen *P6*					193		8.65	9.20
Palmer, Mass. *W6*							8.95	9.50*
Pittsburg, Cal. *C7*	192	210			213		9.60	10.15
Rankin, Pa. *A5*	173	187			193		8.65	9.20
So. Chicago *R3*	173	187			193		8.65	9.20
S. San Fran. *C6†*				236			9.60	10.15†
SparrowsPt. *B3***	175			214	198		8.75	9.425
Sterling, Ill. *N4*****	175	192	172	214	198		8.75	9.425
Struthers, O. *Y1**							8.65	9.30
Worcester *A5*	179						8.95	9.50
Williamsport *S5*								

* Zinc less than .10¢.
** 11-12¢ zinc.
*** 10¢ zinc.
† Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. *T8*	9.50	10.40	12.60	15.60	18.55
Bristol, Conn. *W12*		10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70		
Detroit *D1*	9.05	10.50	12.70	15.70	
Detroit *D2*	9.05	10.50	12.70		
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60		
Franklin Park, Ill. *T8*	9.05	10.25	12.45	15.45	18.40
Harrison, N. J. *C11*			12.90	16.10	19.30
Indianapolis *J3*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Pittsburgh *S7*	8.95	10.40	12.60	15.60	18.55
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*		10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *J3*	8.95	10.40	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
National Tube	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
Pittsburgh Steel	2	13	36.34	42.56	.....
	2½	12	48.94	57.31	.....
	3	12	56.51	66.18	.....
	3½	11	65.97	77.25	.....
	4	10	87.61	102.59	.....

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
	Pct. Discounts			
½" and smaller x 6" and shorter	49	54	56	57
⅝" thru 1" x longer than 6"	35	40	43	45
Rolled thread carriage bolts ½" & smaller x 6" and shorter	49	54	56	57
Lag, all diam. x 6" & shorter	49	54	56	57
Lag, all diam. longer than 6 in.	39	44½	47	48½
Plow bolts, ½" and smaller x 6" and shorter	49	54	56	57

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	60½
⅞ in. to 1 in. inclusive	55½
1⅛ in. to 1½ in. inclusive	58½
1⅝ in. and larger	53½
C. P. Hex, reg. & hvy.	
¾ in. and smaller	60½
⅞ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	46½
Semi-finished Hex Nuts	
⅝ in. or smaller	60½
¾ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½

(Add 25 pct for broken case or keg quantities)

Finished

⅞ in. and smaller 63

Rivets

	Base per 100 lb
½ in. and larger	$12.25
	Pct. Off List
7/16 in. and smaller	19

Cap Screws

	Discount (Packages) *Full Finished H. C. Heat Treat*
New std. hex head, packaged	
⅜" diam. and smaller x 6" and shorter	40
½", ⅝", and 1" diam. x 6" and shorter	22
⅜" diam. and smaller x longer than 6"	8
½", ⅝", and 1" diam. x longer than 6"	+ 6

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	58	49
¾" through 1" dia. x 6" and shorter	45	33

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Discount Mach. Screws	Stove Bolts
Cartons	19	32
Bulk — *Quantity*		
To ¼" diam. incl. — 25,000-200,000	9	54
5/16 to ½" diam. incl. — 25,000-200,000	9	54
All diam. over 3" long — 5,000-100,000	—	54

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
In Bulk — *Quantity*		
⅜" diam. & smaller — 15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.7
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955 value, Class B or heavier 3 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	42.00
Electrodeposited	33.25
Brass, 80-20, ball anodes, 2000 lb or more	44.00
Zinc, ball anodes, 2000 lb lots (for elliptical add 1¢ per lb)	16.50
Nickel, 99 pct plus, rolled carbon, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.55
Tin, ball anodes $1.13 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	71.70
Copper sulphate, 100 lb bags, per cwt.	24.35
Nickel salts, single, 100 lb bags	40.50
Nickel chloride, freight allowed, 300 lb	48.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums (Philadelphia price 24.50)	24.05
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 10,000 lb or more	31.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over	10.5¢
F.O.B. Riverton or Camden, New Jersey, freight allowed west of Miss. River	9.5¢
Domestic sponge iron, 98+% Fe, 23,000 lb. and over del'd East of Miss. River	10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River	9.5¢
Canadian sponge iron, del'd in East, carloads	10.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	27.0¢
Carbonyl iron size 3 to 20 micron, 98%, 99.8+% Fe	88.0¢ to $2.85
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	31.1¢ to 47.1¢
Copper, electrolytic	41.50¢
Copper, reduced	40.3¢ to 48.8¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe, 03 max. Del'd	$5.00
Lead	21.50¢ lb, f.o.b. plant
Manganese f.o.b. Extron, Pa.	46.0¢
Molybdenum, 99%	$3.60 to $3.95
Nickel, chemically precipitated	$1.05
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed −80	$1.13
Silicon	43.50¢
Solder powder	13¢ plus met. value
Stainless steel, 302	$1.02
Stainless steel, 316	$1.30
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh) $3.75 (nominal)	
Zinc, 5000 lb & over	17.5¢ to 30.7¢

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery; Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.64	8.97	9.05	9.01	10.68				
Baltimore	$.10	8.38	8.98	9.71	8.86	8.76	9.29	9.16	11.44*	16.18	15.18	19.73	18.98
Birmingham	.15	8.18	9.45	10.15	8.23	8.56	8.64	8.60	10.57				
Boston	.10	9.48	10.54	11.55	9.52	9.82	9.73	9.83	13.00	15.79	15.38	19.89	19.18
Buffalo	.15	8.40	9.15	11.22	8.65	9.05	9.05	8.95	11.05*	16.34	15.15	19.01	18.95
Chicago	.15	8.35	9.60	10.15	8.38	8.71	8.79	8.75	8.95	15.80	14.80	19.35	18.60
Cincinnati	.15	8.49	9.65	10.20	8.69	9.08	9.33	9.07	9.46	15.61	15.11	18.96	18.91
Cleveland	.15	8.33	9.60	10.10	8.48	8.94	9.16	8.84	10.95*	15.89	14.89	19.44	18.96
Denver	.20	9.70	11.30	12.49	9.80	9.70	9.80	9.98	10.65				17.60
Detroit	.15	8.58	9.85	10.50	8.73	9.06	9.33	9.05	9.30	15.46	15.06	18.81	18.86
Houston		7.45	8.75		7.60	8.05	7.60	7.55	11.10	16.20		19.30	19.05
Kansas City	.20	9.02	10.27	10.07	9.05	9.38	9.46	9.42	9.87	20.02	15.47	20.02	19.27
Los Angeles	.10	8.60**	10.85	11.75	8.65	8.65	8.70	8.80	13.35*	17.05	16.10	21.05	20.35
Memphis	.15	8.55	9.80		8.60	8.93	9.01	8.97	12.11*				
Milwaukee	.15	8.48	9.73	10.28	8.51	8.84	9.00	8.88	9.18	15.43	14.93	18.78	18.73
New York	.10	8.97	10.23	10.66	9.41	9.53	9.45	9.67	12.86*	15.02	15.19	18.42	18.99
Norfolk	.20	8.00			8.40	8.35	8.70	8.45	10.70				
Philadelphia	.10	8.10	9.00	9.97	8.79	8.87	8.60	8.75	11.61*	15.61	15.11	18.96	18.91
Pittsburgh	.15	8.33	9.60	10.50	8.48	8.71	8.79	8.75	10.95*	15.80	14.80	19.35	18.60
Portland		8.50	11.20	11.55	9.05	8.30†	8.65	8.65	14.50	18.50	16.10	20.75	20.25
San Francisco	.10	9.45	10.85	11.10	9.55	9.70	9.60	9.80	13.10	17.05	16.10	21.05	20.35
Seattle		9.95	11.15	12.00	10.00	9.70	9.80	10.80	14.05	16.55	16.35	20.65	20.15
Spokane	.15	10.10	11.30	12.15	10.15	9.85	9.95	10.25	14.20		17.35	21.55	21.05
St. Louis	.15	8.69	9.94	10.51	8.74	9.08	9.25	9.12	9.56	15.66	15.16	19.01	18.96
St. Paul	.15	8.94	10.19	10.76	8.99	9.45	9.53	9.37	9.81		15.26		19.06

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** All sizes except 18 and 16 gage. †† 10¢ zinc. † Deduct for country delivery. ‡ 3/16 in. to ½ in. * C1018—1 in. rounds.

(Effective Feb. 10, 1958)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	
Birmingham *R3*	62.00	62.50*			
Birmingham *W9*	62.00	62.50*	66.50		
Birmingham *U4*	62.00	62.50*	66.50		
Buffalo *R3*	66.00	66.50	67.00	67.50	
Buffalo *H1*	66.00	66.50	67.00	67.50	
Buffalo *W6*	66.00	66.50	67.00	67.50	
Chester *P2*	66.50	67.00	67.50		
Chicago *I4*	66.00	66.50	66.50	67.00	
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50		.....
Fontana *K1*	75.00	75.50			.....
Geneva, Utah *C7*	66.00	66.50			.....
Granite City *G2*	67.90	68.40	68.90		.....
Hubbard *Y1*			66.50		.....
Ironton, Utah *C7*	66.00	66.50			.....
Midland *C11*	66.00				.....
Minnequa *C6*	68.00	68.50	69.00		.....
Monessen *P6*	66.00				.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*		66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	66.50	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00		66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	74.00
Youngstown *Y1*			66.50	67.00	.....

DIFFERENTIALS: Add, 75c per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct); 50c per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.00	23.75	23.25	25.25	—	27.00	39.75	32.25	37.00	—	16.75	—	17.00
Slabs, billets	27.00	27.00	28.00	31.50	32.00	33.25	49.50	40.00	46.50	—	21.50	—	21.75
Billets, forging		36.50	37.25	38.00	41.00	40.50	62.25	47.00	55.75	32.00	28.25	28.75	28.75
Bars, struct.	42.00	43.00	44.25	45.00	48.00	47.75	73.00	55.50	64.75	37.75	33.75	34.25	34.25
Plates	44.25	45.00	46.25	47.25	50.00	50.75	76.75	59.75	69.75	40.25	35.00	36.75	36.00
Sheets	48.50	49.25	51.25	52.00	—	55.00	80.75	65.50	79.25	48.25	40.25	—	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	—	55.00	80.75	65.50	79.25	48.25	40.25	—	40.75
Wire CF; Rod HR	40.00	40.75	42.00	42.75	45.50	45.25	69.25	52.50-52.75	61.50	35.75	32.00	32.50	32.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*, Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown, *J5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U5* (plus further conversion extras); *W1*; New Bedford, Mass. (.25¢ per lb higher), *R6*; Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*, Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A3*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Detroit, *R3*; Gary, *U1*; Owensboro, Ky., *G5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*, Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.
Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown; *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forging billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R3*; Munhall, Pa., S. Chicago, *U1*; Owenboro, Ky., *G5*.

(Effective Feb. 10, 1958)

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.50
0.025% C (Simplex) 36.75
7-8½% max C, 50-55% Cr, 3-6% max Si 25.00
7-8½% max C, 50-55% Cr, 3% max Si 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
2 to 11% C, 88-91% Cr, 0.75% Fe...	1.40

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads	27.50	14.20
Ton lots	32.75	15.65
Less ton lots	34.35	17.30

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Ca, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80-85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	15.10
Ton lots, packed, pallets	16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe..	24.20	22.90
98% Si, 0.75% Fe	24.95	23.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	7.70
Ton lots, packed	10.50

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.20	75% Si....	16.40
65% Si....	15.25	85% Si....	18.10
	90% Si....	19.50	

Ferrovanadium

50-55% V delivered, per pound, contained V, carloads, packed.

Openhearth	3.20
Crucible	3.30
High speed steel (Primos)	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

(Effective Feb. 10, 1958)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.28

Ferrocolumbium, 50-50%, 2 in. x D, delivered per pound contained Cb.

Ton lots	$4.90
Less ton lots	4.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Sb plus Ta $4.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.68

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.60 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.41
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-88% V_2O_5 per pound contained V_2O_5 .. $1.38

Zirconium, per lb of alloy

35-40% f.o.b. freight allowed, carloads, packed	27.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B 3-4%, Si 40-45%, per lb contained B

2000 lb carload	$5.50

Bortram, f.o.b. Niagara Falls.

Ton lots per pound	45¢
Less ton lots, per pound ...	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound	14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots. $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

Detroit Banks On Tooling Pickup

Used machinery dealers there hope recent activity in previously idle tool and die shops is a good omen.

Right now toolroom items are moving well, but production equipment is weak.

▪ Tool and die shops, idle for several months, are showing scattered signs of life. And used machinery dealers in the Detroit area hope activity will develop a strong enough pulse to inject life into sagging sales. Dealers have noticed the activity on two fronts—users turning out for auctions and more inquiries.

Current purchasing is limited to spot buying at auctions. Users attending several recent auctions snapped up some 75 pct of the equipment offered at extra high prices. Dealers say they can supply comparable equipment with a guarantee and returned rights at competitive prices, but aren't getting much of a tumble from the customers.

While this perplexes dealers, it also gives them some hope for the future. They see customers with money. They see them willing to spend it. And they see them willing to pay good prices for good equipment.

Shears Are Popular—Interest in shears of all sizes is relatively strong—particularly ⅜ to ¾ in. capacity and handling lengths up to 8 and 10 ft. However, they are in short supply.

Interest in toolroom equipment, which has been fair to good, is getting better. Mills of all types are being sought by customers, with a lot of inquiries for 4, 5 and 6 in. boring mills and vertical mills.

Production equipment is still the weakest area of the market. It is not just a question of price. The price is down. But automotive and appliance parts manufacturers are not in the market. They have become very sensitive to market ups and downs and prefer to hold on to their money. Any firming of consumer interest in these industries could bring them into show rooms again with a desire to buy.

Depreciation Urged

Prompt and serious study by Congress of several pending small business tax adjustment proposals —including a provision to provide alternative methods of depreciation on used machinery—is urged by Senator John Sparkman.

The Alabama Democrat, Chairman of the Senate Small Business Committee, has joined ranking minority member of the Committee, Senator Edward J. Thye, (R., Minn.) in labeling the reforms "urgent."

The legislation incorporating the adjustments is Senate Bill 3194 introducted in the Senate in January. It is based on a year-long study of small business tax problems by the committee.

Sen. Sparkman concluded by saying, "The most helpful thing that can be done for the small business men of the country is give them equal opportunity for growth and development by removing discriminatory provisions from the Internal Revenue Code and extending equal advantages to them."

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
10' x 10" ga. Bertsch Initial Type
10' x ½" King Pyramid Type
18' x 1" Niles Pyramid Type
8' x ¾" Bertsch Initial Type

BORING MILL—HORIZONTAL
Cincinnati Gilbert Model 3—4½" Dia. Spindle, 86" Travel, 38" x 84" Table—NEW 1956

BRAKE—PRESS TYPE
10' x ⅛" & 12' x ⅛" Hydraulic—NEW

BUILDING 120' x 420' New Steel Frame—Unerected

CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P&H	56' Span	220/3/60
5 ton P&H	50' Span	115 Volt D.C.
5 ton Cleveland	60' Span	110 Volt D.C.
5 ton Shepard Niles	70' Span	230 Volt D.C.
8 ton P&H	55' Span	220/3/60
10 ton Shepard Niles	38' Span	440/3/60
10 ton Shaw	48' Span	230 Volt D.C.
10 ton Shaw	120' Span	230 Volt D.C.
15 ton Shepard Niles	52' Span	230 Volt D.C.
20 ton Shaw	28' Span	230 Volt D.C.
50 ton Northern	52' Span	440/3/25 A.C.
120 ton P&H	66' Span	220/3/60 A.C.
120 ton Shepard Niles	77' Span	220/3/60

CRANE GIRDERS
10 ton Capacity 77' 2" Span—No Motors

DRAW BENCHES
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10,000# Aetna Standard Single Draw 44 Ft. Length of Draw

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1" to 5" Acme, Ajax, National

FURNACE—MELTING
15 ton Heroult Top Charge, 12' Shell Complete with Transformers

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HEADERS
#250C Manville Solid Die Single Stroke
#44 Waterbury Farrel DSOD Capy. ⅝" x 6"

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25" Torrington, 19 Rolls 1 31/32", dia.
28" Voss Chain Leveler, Capacity .025 to .075

PRESSES—HYDRAULIC
500 ton Watson Stillman 4 Col. Piercing Press
300 ton HPM Fastraverse, Bed 36" x 36"
600 ton Elmes, 36" Stroke, 48 x 45" Bet. Cols.
1500 ton Bliss 15" Stroke, Bed 49" x 48"
1500 ton Mesta Steam Hydr. Forging Press
4500 Baldwin-Lima-Hamilton Hydr. Forging Press

PRESS—KNUCKLE JOINT
600 ton Bliss No. 25, 2½" Stroke, Bed 24 x 29"

PRESSES—STRAIGHT SIDE
180 ton Hamilton #847, 12" Str. 85½" Bet. Ups.
200 ton Clearing F1200-42, Stroke 30", Bed 44"x38"
250 ton Bliss SI 7⅛ Str. Bletr. 33" x 30"

PUNCH & SHEAR COMBINATIONS
Cleveland Style C, Arch. Jaw, Capy. ¾" x ¾"
Cleveland Style EF, Arch. Jaw, Capy. 1¼" x 1"
Cleveland Style G Single End, 60" Throat
Cleveland Style W, 60" Throat, Architectural Jaw

ROLLING MILLS
8" x 10" Schmitz Single Stand Two High
10" x 14" Single Stand Two High
10" x 16" Single Stand Two High
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12" x 16" Single Stand Two High
16" x 24" Single Stand Two High
20" x 36" Single Stand Two High

ROLLS—FORMING
6 Stand Yoder M-1½
14 Stand Yoder, 2½" Shaft, 30" Bet. Housings
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CAPACITY		NAME	SPAN	LIFT
10		Shaw	47'	15'
15		Shaw	67'	26'
150	**	N B P	75'	40'
20	*	N B P	71'10"	25'6"
20	*	N B P	71'10"	25'6"
150	**	Shepard Niles	100'	39'
40	***	Harnisfeger	98'10"	40'8"
20	*	Shepard Niles	98'10"	27'
20	*	Shaw	96'	27'
20	*	Shepard Niles	96'	28'
20	*	Shepard Niles	96'	26'
50	****	Shepard Niles	100'6"	25'
20	*	P & H	100'6"	24'9"

* 20T. bridge with (2) 10 T. trolleys
** 150 T. bridge with only (1) 75 T. trolley (add'l. 75 T. trolleys may be available)
*** 40 T. bridge with (2) 20 T. trolleys
**** 50 T. bridge with (2) 25 T. trolleys

CAPACITY		NAME	SPAN	LIFT
10		Niles	64'8"	23'
10		Shaw	64'8"	22'
10		N B P	52'	19'
10		P & H	52'	19'
75	†	Shaw	75'	36'

†150 T. bridge with only (1) 75 T. trolley which has 10 T. auxiliary)

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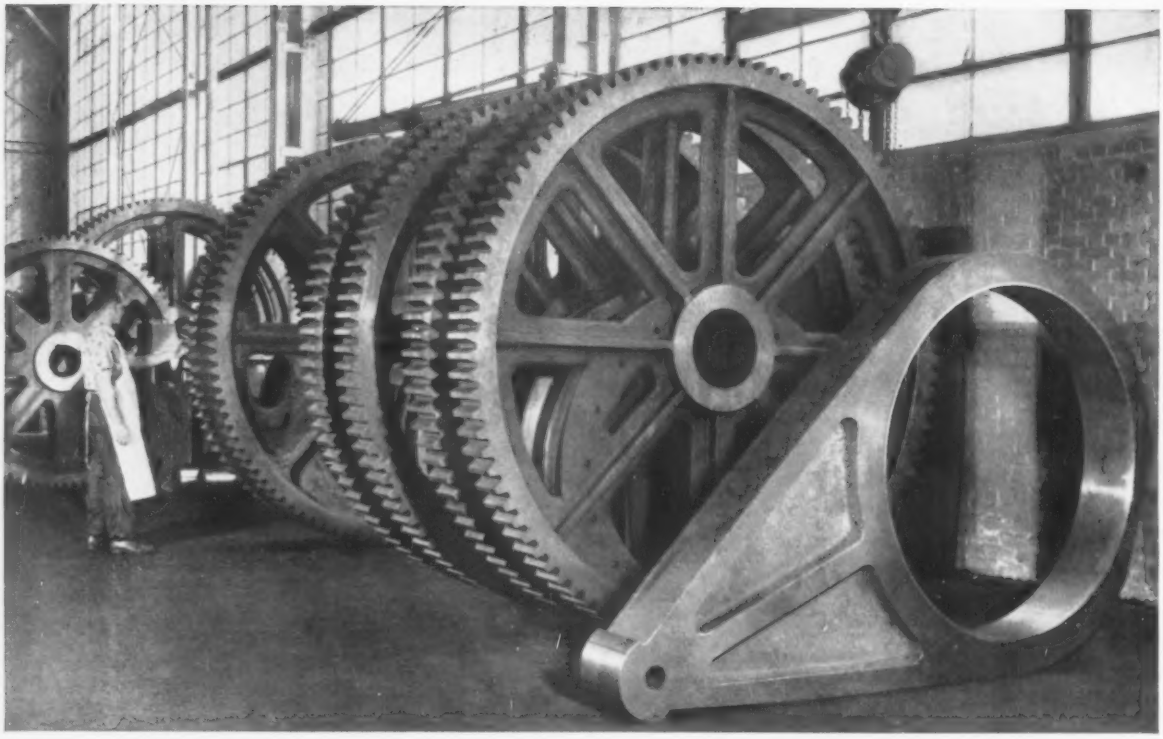

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"In the intermediate spur tooth gears and high speed herringbone gears of these large presses, good tooth-bearing surface qualities are particularly important. These gears are subjected to heavy stresses in clutching and braking.

"The use of ductile iron enabled the eccentric strap portion of the connecting rods to be held to as small a cross section as would be possible with steel – a distinct advantage in gaining operating clearances. The knuckle joint end, which is subject to high bearing loads at the time of impact, has better wearing properties in a bearing surface than could have been attained with an unheat-treated steel."

2000-ton "tryout" press (shown forming auto fenders) can handle most large dies or group of dies. Built by Federal Engineering Company, Detroit, a major builder of machinery, dies and tools, and designed by Stewart Cumming & Son, Ferndale, Michigan (engineers in the same line) with ductile iron in key operating parts.

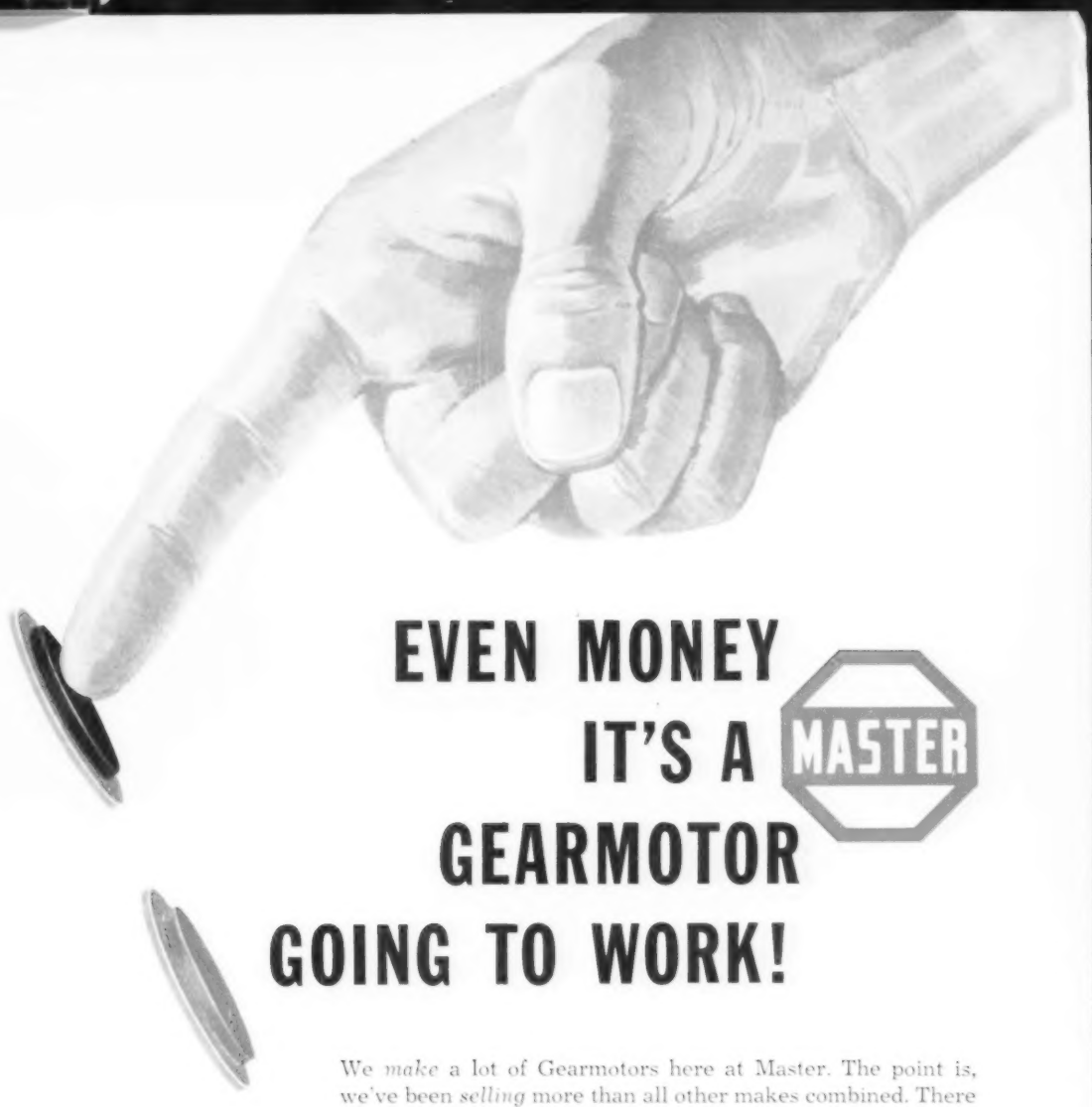
More ductile iron advantages...

Other designers report additional ductile iron advantages for gears: excellent machinability, high damping capacity, and good castability. Surface hardening techniques can usually be used, too, to increase hardness to 600 BHN.

You'll find all these subjects and more covered *in detail* in Inco's new "Ductile Iron Digest." Send for one.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street INCO New York 5, N. Y.

D ductile iron...the cast iron that can be twisted and bent.



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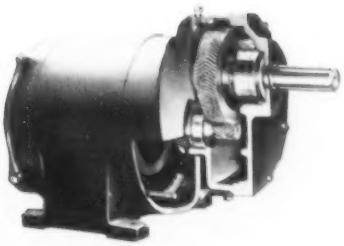

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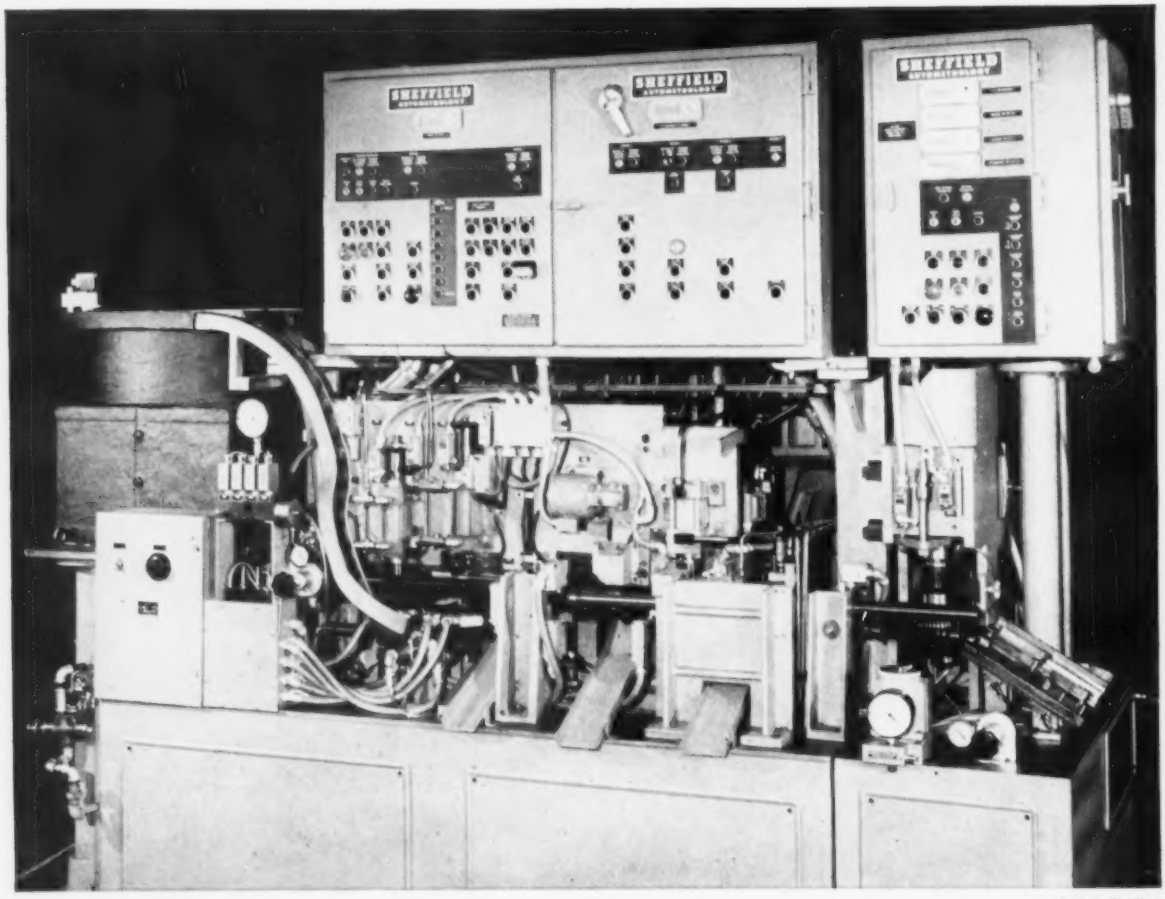

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